ORDER NO. VKD8503094C1

Service Manual

PAL Colour Video Camera

WV-N3 Series

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Panasonic

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Vol. 1

The circuit description contains only the different portion from WV-555 Series and WV-555A/B Series.
The composition for circuit description of WV-N3 Series are descrived in the Table-1. 1.

Circuit Descriptions	**WV-N3**	**WV-555A/B**	**WV-555**
1. Outline	○		
2. Optics System	○		○
3. Pre-Preamplifier and Preamplifier Board			○
4. Process-1 Board			
4-1 +1.8V/+4.5V DC Regulator Circuit	○		
4-2 V. Sawtooth/Parabola Generator Circuit			○
4-3 H. Sawtooth/Parabola Generator Circuit			○
4-4 Shading Signal Circuit	○		
4-5 B Shading Correction/Gain Control Circuit	○		
4-6 G Shading Correction/Gain Control Circuit	○		
4-7 R Shading Correction/Gain Control Circuit	○		
4-8 High Gain Switching Circuit	○		
4-9 Blanking Offset Control Circuit	○		
5. Process-2 Board			○
6. Encoder Board			○
7. Auto Board			○
8. Sync Board		○	
9. Detail Board		○	
10. Deflection Board			
10-1 DC Regulator Circuit	○		
10-2 Alignment Circuit	○		
10-3 Horizontal Deflection Circuit	○		
10-4 Horizontal Linearity Circuit	○		
10-5 Vertical Sawtooth Generator Circuit			○
10-6 Vertical Deflection Circuit			○
10-7 Vertical Linearity Circuit			○
10-8 Skew Circuit			○
10-9 Centering Control Circuit			○
10-10 Centering/Skew Output Circuit	○		
10-11 Target Protection Circuit			○
10-12 Target Voltage Control Circuit	○		
11. High Voltage Board			
11-1 High Voltage Circuit	○		
11-2 –9V DC Regulator Circuit			○
11-3 Feedback Beam Control Circuit			○
11-4 Cathode Blanking Circuit	○		
11-5 Dynamic Focus Circuit			○
11-6 AIC Control Circuit			○
12. Mic Board			○
13. Mother Board			○
14. 1.5" Viewfinder WV-VF32B			○

Table-1

Note ○ : Apply for contents of respective Service Manual.

SPECIFICATIONS

ENG Colour Camera WV-N3

Pick-up System :	Middle index prism system using three Newvicon® tubes
Pick-up Tube :	Three 1/2″ electrostatic focusing, magnetic deflection Newvicon® tube, type S4701
Scanning Standard :	625 lines, 50 fields, 25 frames
Synchronizing System :	Internal or external (gen-lock) switchable automatically Internal : PAL standard External (gen-lock) Input : PAL composite (VBS) signal or black burst signal
Subcarrier Phase for Gen-Lock :	Adjustable more than 360°
Horizontal Phase for Gen-Lock :	Adjustable from –0.1 μsec to +3.5 μsec
Video Output :	Two outputs 1.0Vp-p PAL composite/75 ohms x 1 (BNC connector) 1.0Vp-p PAL composite/75 ohms x 1 (32-pin VTR/RCU connector)
Monitoring Video Output (Pix Output) :	R-G or B-G composite signal selectable/75 ohms x 1 (BNC connector)
Auxiliary Input :	1.0 Vp-p composite/75 ohms through 32-pin VTR/RCU connector
Audio Input :	Mic Input : -72 dBm x 1 (XLR type connector)
Audio Output :	-20 dBm or -70dBm switchable (32-pin VTR/RCU connector)
Illumination Required :	140 footcandles(1400 lux) at F4.0
Minimum illumination:	22 lux at F1.4 with +18 dB gain
Signal-to-Noise Ratio (Nominal):	54 dB (luminance) at 140 footcandles(1400 lux), F4.0 without gamma and aperture correction
Horizontal Resolution (at center) :	Green signal : 600 lines
Geometric Distortion :	Less than 2%
Sweep Linearity :	Less than 2%
Registration :	Less than 0.1% within circle having a diameter 80% of picture height Less than 0.2% within circle having a diameter of picture height Less than 0.5% elsewhere
Vertical Enhancer :	Standard : 2-line type
White Balance :	Automatic
Black Balance :	Automatic
Centering for Registration :	Automatic or manual
Feedback(Automatic) Beam Control :	2 F-stop (4 times)
Colour Bar :	EBU colour bar generator
Colour Conversion Filters :	3200°K, 5600°K, 5600°K with 12.5% ND, close
Maximum Cable Length :	VTR Cable : 10m (30ft) 32-pin Studio Cable : 100m (300ft) with cable compensator
Switches :	Power, Standby, Colour Bar/Camera Selection, +9 dB/+18 dB High Gain Selection, Auto White/Auto Black Set, Auto/Manual Centering Selection, Auto Centering Set, Monitor PIX Select, Level Indicator ON/OFF
Controls :	R and B vertical and horizontal centering, Intercom Level
Lens:	Option
Lens Mount :	Bayonet mount
Power Source :	12V DC five (5) ways such as; (1) Battery pack (2) AC adaptor (3) External DC through 4-pin external DC connector (4) VTR (external AC adaptor) (5) Remote control unit through 32-pin camera cable

® : Registered Trademark

Battery Pack Operating Time : Approx. 1 hour with attached WV-PS37
Approx. 2 hours with optional WV-PS36

Power Consumption : Camera Head : 18 watts (12V DC, 1.5A)
ENG Configuration : 21 watts (12V DC, 1.75A)
Studio Configuration : 55 watts (with RCU 220V/240V AC, 50Hz)

Ambient Operating Temperature : −10°C ~ +45°C

Ambient Operating Humidity : 30% - 90%

Dimensions : Camera Head Only ; 6-5/16"(W) x 10-1/8"(H) x 12-5/16"(D)
160(W) x 257(H) x 312(D) mm
ENG Configuration ; 10-1/2"(W) x 10-1/8"(H) x 21"(D)
266(W) x 257(H) x 533(D) mm
Studio Configuration ; 7-1/16"(W) x 16-15/16"(H) x 20-1/8"(D)
180(W) x 430(H) x 511(D) mm

Weight : Camera Head Only ; 7.7 lbs (3.5 kg)
ENG Configuration ; 14.3 lbs (6.5 kg)
Studio Configuration ; 16.1 lbs (7.3 kg)

Weights and dimensions shown are approximate.
Weights and dimensions shown include optional zoom lens WV-LZ32/10.
Specifications are subject to change without notice.

CIRCUIT DESCRIPTION

1. Outline

Incoming light which contains red (R), green (G) and blue (B) light enters a dichroic prism through a zoom lens and separated into the R, G and B light respectively. The separated R, G and B light go to the respective pick-up tubes and converted into the video signal whose level corresponds to the incoming light intensity. The video signals from the pick-up tubes are then sent to the Pre-preamplifier and Preamplifier circuit and the video signals are amplified to the necessary level.
The amplified R, G and B signals are supplied to the dark shading correction circuit in the Process-1 board where their dark shading is corrected and the gain of R, G and B signal is controlled by setting the High Gain Selection Switch. The dark shading correction signal is generated in the shading signal circuit. In the dark shading correction/gain control circuit, the gain of R and B signal are controlled automatically by the DC voltages from the Auto board to match them with that of G signal. In this way, the white balance is set automatically.

The R, G and B signals from the Process-1 board are fed to the signal processing circuit in the Process-2 board, where these signals undergo the gamma correction to correct non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and to produce a linear picture of high fidelity. These signals also receive low level clip for setting the pedestal level and high level clip to clip excessively high level. In the signal processing circuit, the pedestal level of R and B signal are controlled automatically by the DC voltages from the Auto board to match them with that of G signal for the black balance. The R, G and B signal from the signal processing circuit are sent to the ALC NAM control circuit and the highest signal among them is detected. The NAM signal is used to control the lens iris corresponding to the incoming light intensity. The NAM signal is also sent to the level indicator drive circuit to generated the signal to indicate the signal level,on the viewfinder. The G signal from the G dark shading correction/gain control circuit in the Process-1 board is fed to the vertical (V) detail signal generator and the horizontal (H) detail signal generator in the Detail board. The H detail signal and V detail signal thus generated are mixed together, fed through the detail out circuit to R, G and B signal processing circuit in the Process-2 board, and added to the R, G and B signal to enhance the horizontal and vertical resolution. The G signal from the Process-1 board is fed to the G signal delay circuit to delay the G signal in order to match the G signal with the detail signal in phase.
The R, G and B signal are then supplied to the camera/bar select circuit. The R, G and B color bar signal are also sent to the select circuit from the color bar circuit. These signal are selected by setting the color bar/camera selection switch and sent to the U, V and luminance (Y) matrix circuit respectively. U and V signal are then sent to the balance modulator circuit to generate the chrominance signal. The chrominance signal is sent to the PAL output circuit where it is mixed with the Y signal to make an PAL signal. The PAL signal is sent to other system product through a video output connector. The R, G, B and Y signal are fed to the PIX select circuit. In the PIX select circuit, R-G or B-G signal is selected for the registration adjustment and sent to the PIX output/gen-lock input connector.

The R, G and B signal are sent to the auto white control circuit, auto black control circuit and auto centering comparison circuit respectively. In the auto white control circuit, the R and B signal level are compared with the reference G signal and the difference in comparison is sent to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B dark shading correction/gain control circuit to control the gain of the R and B signal to match them with the G signal level. In this way, the white balance is automatically set.
Similarly, the dark level of R and B signal are compared with that of G signal in the auto black control circuit. The resultant in comparison is fed to microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B signal processing circuit in order to match the black level of R and B signal with that of G signal automatically.
In the auto centering compensation circuit, the centering (registration) of R and B signal are compared with that of G signal. The difference in comparison is fed through the auto centering control circuit to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit and the Deflection board to the deflection coil for the R and G pick-up tube in order to control the centering of R and B signal for matching them with the G signal.
In this way, the centering is set automatically.
When the auto white, auto black or/and auto centering setting fails, the microprocessor sends the warning signal to the viewfinder through the auto warning output circuit to blink the auto warning indicator.
The 17MHz frequency oscillated by the internal 17MHz oscillator circuit is fed to the sync generator IC which generates the necessary signals/pulses.

The subcarrier (SC) signal is sent through the SC out circuit through the sync generator circuit. When the gen-lock signal (black burst or color signal) is sent through the PIX output/gen-lock input connector to the sync separation circuit, the sync separation circuit separates the sync signal and burst signal and they are sent to the sync generator IC for the gen-lock/external sync mode.

The gen-lock 17MHz oscillator oscillates the 17MHz frequency in order for the horizontal pulse generated from the sync generator IC to match with the horizontal sync of gen-lock signal in phase. The external 17MHz oscillator oscillates the 17MHz frequency in order for the SC signal generated from the sync generator IC to match the burst signal of gen-lock signal in phase. The SC phase shifter circuit shifts the phase of the SC signal in the gen-lock/external sync mode in the multiple camera system.

The horizontal deflection circuit generates the sawtooth current from the Hs pulse for the horizontal(H) beam deflection inside the pick-up tubes and sends to the H deflection coils for the R, G and B pick-up tubes. The flyback pulse generated in the horizontal deflection circuit is converted into parabola signals in the horizontal linearity circuit and these signals are also fed to the H deflection coil for the linear H beam deflection. The vertical scanning start(Vs) pulse is supplied to the V sawtooth generator circuit and converted into a vertical(V) sawtooth signal. The V sawtooth signal is then fed to the vertical deflection circuit and vertical linearity circuit. The V sawtooth signal is converted into a V parabola signal in the vertical linearity circuit and fed to the vertical deflection circuit too. In the vertical deflection circuit, the V sawtooth signal for V deflection and V parabola signal for V linearity correction are mixed and amplified. The mixed signal is then sent to the V deflection coil for the R, G and B pick-up tubes. The skew circuit sends the V sawtooth signal to the horizontal deflection circuit through the centering/skew output circuit together with automatic or manual centering DC voltages for the registration among the R, G and B pick-up tubes. Target voltage circuit produces target Esj voltage from high voltage and sends them to the electrodes of R, G and B pick-up tubes. The target protection circuit receives the H deflection and V deflection signal and converts into the DC potential. The DC potential is sent to the high voltage circuit in the High voltage board for the target protection of pick-up tubes.

The high voltage circuit generates the DC voltages for the pick-up tubes using a DC-DC converter and supplies them to the electrodes of R, G and B pick-up tubes. The DC potential is fed to the high voltage circuit from the target protection circuit for the target protection. In the normal operating condition, the high potential is fed to the high voltage circuit and the high voltages are generated. However, the H or/and V deflection circuit fails, the low level is fed to the high voltage circuit and it stops generating the high voltages. In this way, the target of pick-up tubes are protected. The feedback beam control circuit receives the R, G and B signals from the R, G and B dark shading correction/gain control circuit respectively.

The R, G and B signals are positively fed back to the grid-1(G1) of related pick-up tube for setting the beam current to optimum level automatically corresponding to the intensity of the scene. The -9V DC regulator circuit produces the -9V DC by regulating the -12V generated in the high voltage circuit. The horizontal scanning start (Hs) pulse and the vertical scanning start(Vs) pulse are fed to the cathode blanking circuit where they are mixed and the composite cathode blanking pulse is made. It is then fed to the cathode of R, G and B pick-up tubes. The AIC control circuit receives the NAM signal corresponding to the incoming light intensity and controls the lens iris.

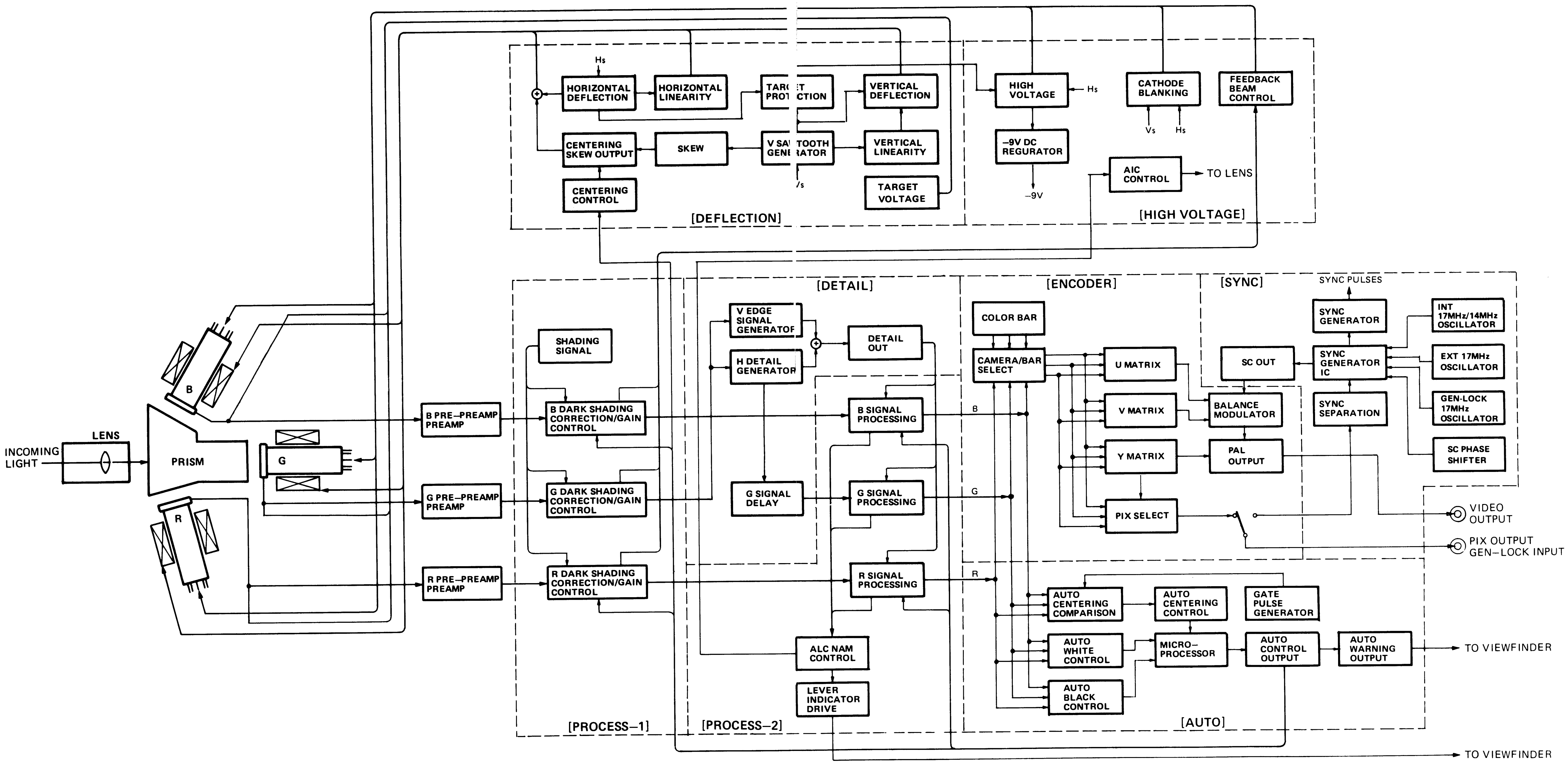
INCOMING LIGHT
LENS
PRISM
B
G
R
B PRE–PREAMP PREAMP
G PRE–PREAMP PREAMP
R PRE–PREAMP PREAMP
Hs
HORIZONTAL DEFLECTION
HORIZONTAL LINEARITY
TAR ET PROT CTION
VERTICAL DEFLECTION
CENTERING SKEW OUTPUT
SKEW
V SA TOOTH GENE ATOR
VERTICAL LINEARITY
/s
CENTERING CONTROL
TARGET VOLTAGE
[DEFLECTION]
HIGH VOLTAGE
Hs
–9V DC REGURATOR
–9V
CATHODE BLANKING
Vs
Hs
FEEDBACK BEAM CONTROL
AIC CONTROL
TO LENS
[HIGH VOLTAGE]
[DETAIL]
V EDGE SIGNAL GENERATOF
H DETAIL GENERATOR
DETAIL OUT
SHADING SIGNAL
B DARK SHADING CORRECTION/GAIN CONTROL
G DARK SHADING CORRECTION/GAIN CONTROL
R DARK SHADING CORRECTION/GAIN CONTROL
G SIGNAL DELAY
B SIGNAL PROCESSING
G SIGNAL PROCESSING
R SIGNAL PROCESSING
B
G
R
ALC NAM CONTROL
LEVER INDICATOR DRIVE
[PROCESS–1]
[PROCESS–2]
[ENCODER]
COLOR BAR
CAMERA/BAR SELECT
U MATRIX
V MATRIX
Y MATRIX
PIX SELECT
BALANCE MODULATOR
PAL OUTPUT
SC OUT
[SYNC]
SYNC PULSES
SYNC GENERATOR
SYNC GENERATOR IC
SYNC SEPARATION
INT 17MHz/14MHz OSCILLATOR
EXT 17MHz OSCILLATOR
GEN-LOCK 17MHz OSCILLATOR
SC PHASE SHIFTER
VIDEO OUTPUT
PIX OUTPUT GEN–LOCK INPUT
AUTO CENTERING COMPARISON
AUTO CENTERING CONTROL
GATE PULSE GENERATOR
AUTO WHITE CONTROL
MICRO–PROCESSOR
AUTO CONTROL OUTPUT
AUTO WARNING OUTPUT
AUTO BLACK CONTROL
[AUTO]
TO VIEWFINDER
TO VIEWFINDER

Fig. 1-1 Outline of WV-N3

2. Optics System

• Infrared (IR) Cut Filter

As shown in Fig. 2-5, the pick-up tube has some sensitivity in the infrared region beyond the visible range. The infrared (IR) cut filter cuts off the infrared light rays which the human eye does not see as light. If the color signal is made by using the video signal corresponding to the infrared rays which the human eye can not normally see, the colors of pictures on the monitor and that seen with the naked eye would differ substantially.

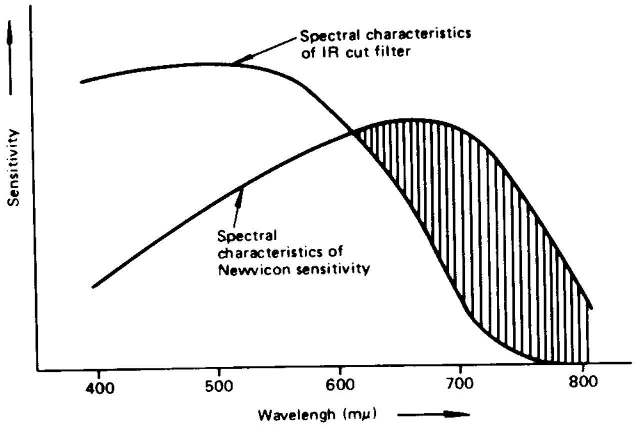

Fig. 1-5 IR Cut Filter Response

• Pick-up Tube

The 1/2 inch NEWVICON tubes are used in this camera as pick-up tubes. The NEWVICON tube has following features in comparison with the vidicon tube.

1. Higher sensitivity
2. Higher resistance against burning
3. Less lag
4. Less dark current/shading

The red(R) and green (G) lights reach on the boundary between the 2nd and 3rd prism and only the R light reflects. The reflected R light is again reflected by the boundary between the 1st and 2nd prism, and enters to the R pick-up tube through the trimming filter and the IR cut filter as in the case of the B light.

The remaining green (G) light which passes through the boundary between the 2nd and 3rd prism goes to the G pick-up tube through the trimming filter and the IR cut filter as in the case of the B and R lights.

4. Process-1 Board

4-1 +1.8V/+4.5V DC Regulator Circuit

Outline

+1.8V and +4.5V DC are produced by regulating +9V DC supplied from the Sync-2 board. The +1.8V DC and the +4.5V DC are used in this board.

Details

The +1.8V and +4.5V DC are generated by regulating +9V DC power with IC5. The reference voltage for +1.8V DC is obtained by dividing the +9V DC using R133 - R136 and obtained at a crosspoint of R135 and R136.

The output voltage at pin 1 of IC5(a) is fed back to pin 2 of IC5(a) for stabilizing the +1.8V DC. The reference voltage for +4.5V DC is obtained at a crosspoint of R133 and R134, and the output at pin 7 of IC5(b) is fed back to pin 6 for stabilizing the +4.5V DC. The +1.8V and +4.5V DC are supplied to the G, R and B shading correction/gain control circuit as reference voltages.

4-4 Shading Signal Circuit

Outline

This circuit makes the dark shading correction signal which flatten the dark signal waveform of the red, green and blue signals.

Details

• B Shading Signal Circuit

The V sawtooth and parabola signals, and the H sawtooth and parabola signals are routed to the wiper arms of blue dark shading correction controls VR2 (B V. SAWTOOTH), VR3 (B V.PARABOLA), VR4 (B H. SAWTOOTH) and VR5 (B H.PARABOLA). These signals are supplied to both the base and emitter of mixer Q14, where they are mixed. The positive or negative blue dark shading correction signal is obtained at the collector of Q14 depending upon the position of these controls and it is sent to pin 13 of analog switch IC4. Analog switch IC4 is controlled by the negative horizontal scanning (Hs) pulse fed to the control terminal (pin 9) of IC4. During the positive portion of Hs pulse, pins 13 and 14 of IC4 are connected and the dark shading correction signal is fed through buffer Q31 to the B shading correction/gain control circuit. During the negative portion of Hs pulse, pins 12 and 14 of IC4 are connected and the DC voltage set by VR18 (B BLANKING OFFSET) is fed to the B shading correction/gain control circuit to equalize the blanking level and dark signal level.

• G Shading Signal Circuit

The G dark shading correction signal is made as in the case of B dark shading correction signal.

The V sawtooth and parabola signals and the H sawtooth and parabola signals are fed to the wiper arms of green dark shading correction controls VR7 (G V. SAWTOOTH), VR8 (G V.PARABOLA), VR9 (G H. SAWTOOTH) and VR10 (G H.PARABOLA). These signals are sent to both the base and emitter of mixer Q28, where they are mixed. The positive or negative green dark shading correction signal is obtained at the collector of Q28 depending upon the position of these controls and it is supplied to pin 3 of analog switch IC4. IC4 is controlled by the negative Hs pulse sent to the control terminal (pin 10) of IC4. During the positive portion of Hs pulse, pins 3 and 4 of IC4 are connected and the dark shading correction signal is fed through buffer Q29 to the G shading correction/gain control circuit. Pins 5 and 4 of IC4 are connected during the negative portion of Hs pulse and the DC voltage set by VR17 (G BLANKING OFFSET) is sent to the G shading correction circuit to equalize the blanking and dark signal level.

• R Shading Signal Circuit

The R dark shading correction signal is made as in the case of B and G dark shading correction signal.

The V sawtooth and parabola signals and the H sawtooth and parabola signals are fed to the wiper arms of red dark shading correction controls VR12 (R V. SAWTOOTH), VR13 (R V.PARABOLA), VR14 (R H.SAWTOOTH) and VR15 (R H.PARABOLA).

These signals are sent to both the base and emitter of mixer Q45, where they are mixed. The positive or negative green dark shading correction signal is obtained at the collector of Q45 depending upon the position of these controls and it is supplied to pin 1 of analog switch IC4. IC4 is controlled by the negative Hs pulse sent to the control terminal (pin 11) of IC4. During the positive portion of Hs pulse, pins 1 and 15 of IC4 are connected and the dark shading correction signal is fed through buffer Q30 to the R shading correction/gain control circuit. Pins 2 and 15 of IC4 are connected during the negative portion of Hs pulse and the DC voltage set by VR16 (R BLANKING OFFSET) is sent to the R shading correction circuit to equalize the blanking and dark signal level.

4-5 B Shading Correction/Gain Control Circuit

This circuit consists of the dark shading correction circuit and gain control circuit.

4-5-1 Dark Shading Correction Circuit

Outline

The pick-up tube produces dark current when the light is blocked by capping the lens for example. The dark current of pick-up tube is extremely small comparing with vidicon. Therefore, when the camera is aimed at the dark scene, potential at the photoconductive (target) layer of pick-up tube becomes lower than that of vidicon and the electron beam becomes insufficient to discharge the target. As a result, the beam does not respond to the variation of incoming light intensity to the pick-up tube and lag increases. (When a moving object is shot, or when the camera is panned, a trailing image is exhibited. This trailing image is called lag.)

In order to minimize the lag, bias lamp is positioned in front of the dichroic prism for increasing the light intensity reaches to the pick-up tube. But the light intensity from the bias lamp is not uniform in actual scanning area.

The dark shading correction circuit equalizes the output of the pick-up tube uniformly in the scanning area. The dark shading correction signal is supplied from the shading signal circuit.

Details

The blue(B) signal Ⓐ is supplied through pin 2 of CN1, buffer Q1 and VR1 (B INPUT GAIN) to emitter of shading correction/amplifier Q2. The B dark shading correction signal Ⓑ is sent from the B shading signal circuit to the emitter of Q2 where it is mixed with the B signal Ⓐ for correcting the dark shading. The B signal Ⓒ which undergoes the dark shading correction and is amplified by Q2 is sent to buffer Q4. The positive horizontal scanning start (Hs) pulse Ⓓ is fed to blanking cleaner Q3 to eliminate the noise during the blanking period.

The B signal at the emitter of Q4 is fed to clamp circuit Q5 where the B signal is clamped by the clamp pulse (CP) supplied to the base of Q5. The clamped B signal is then sent through buffer Q6 and white clip circuit Q7 to pin 4 of amplifier IC1 in the gain control circuit. The white clip circuit clips the signal which exceeds the specified level to prevent the polarity-inversion of B signal in the gain control circuit.

The B signal obtained at the emitter of Q6 is fed through pin 11 of CN1 to the feedback beam control circuit in the High voltage AIC board.

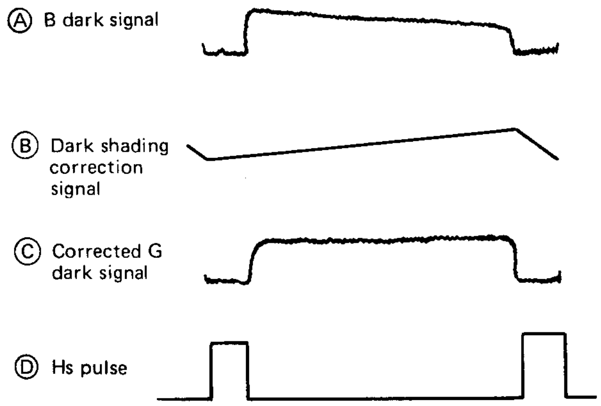

Fig. 4-2-1 Dark Shading Correction

4-5-2 Gain Control Circuit

Outline

This circuit changes the level of B signal by changing the B gain to coincide it with that of G signal for the automatic white balance setting.

This circuit also sets the gain/amplitude of B signal to 0dB, +9dB or +18dB corresponding to the position of high gain selection switch on the side of camera.

Details

The B signal is supplied from the dark shading correction circuit to pin 4 of amplifier IC1 which is a part of automatic white balance setting loop to match the B signal to the G signal in level by changing the gain of IC1. The gain of IC1 is controlled by the DC voltage supplied to pin 6 of IC1 from the Auto board through pin 7 of CN1 and the auto/manual selection switch SW1. When the SW1 is set to the manual position, the fixed voltage set by R137 and R138 is sent to IC1.

The amplified B signal obtained at pin 7 of IC1 is fed through buffer Q9 to high gain control circuit consisting of Q10 - Q12. When the High Gain Selection Switch SW002 on the side of camera is selected to 0dB, +9dB or +18dB position, the DC potential supplied to cross-point of R25 and R26 through pin 19 of CN1 and High Gain Control Selection circuit becomes +9V (open), 0V or -9V and Q11 and Q12 work as shown in the Table below.

Position of High Gain Selection Switch	Gain Control Voltage	Q11	Q12
0dB	+9V (OPEN)	OFF	ON
+ 9dB	0V	ON	ON
+ 18dB	–9V	ON	OFF

When SW002 is set to the 0dB position, +9V is fed to the base of Q11 and Q12, and Q11 turns OFF and Q12 turns ON. As a result, the emitter resistor of amplifier Q10 becomes 560 ohms and the collector resistor becomes 1.1K ohms. When the SW002 is set to the +9dB position, 0V is supplied to the base of Q11 and Q12 turning them ON. Therefore, the emitter resistor of Q10 becomes 180 ohms and the collector resistor becomes 1.1K ohms and gain/amplitude of Q10 becomes three times (+9dB) of that in the 0dB position of SW002. When the SW002 is set to the +18dB position, the gain control voltage becomes -9V turning Q11 ON and Q12 OFF.

Therefore, the emitter resistor of Q10 becomes 180 ohms and the collector resistor becomes 2.2K ohms and the gain/amplitude of Q10 becomes six times (+18dB) of that in the 0dB position.

The B signal thus controlled its gain is then fed to the Process-2 board through buffer Q13 and pin 22 of CN1.

4-6 G Shading Correction/Gain Control Circuit

This circuit consists of the dark shading correction circuit and gain control circuit as in the case of the B shading correction/gain control circuit.

4-6-1 Dark Shading Correction Circuit

Outline

Refer to 4-5-1 Dark Shading Correction Circuit for the blue(B) signal on page 13.

Details

This circuit is same as that for the B signal. Refer to the circuit description of B dark shading correction circuit on page 13.

The green(G) signal is supplied through pin 4 of CN1, buffer Q15 and VR6 (G INPUT GAIN) to emitter of shading correction/amplifier Q16. The G dark shading correction signal is sent from the G shading signal circuit to the emitter of Q16 where it is mixed with the G signal for correcting the dark shading. The G signal which undergoes the dark shading correction and is amplified by Q16 is sent to buffer Q18. The positive horizontal scanning start (Hs) pulse is fed to blanking cleaner Q17 to eliminate the noise during the blanking period. The G signal at the emitter of Q18 is fed to clamp circuit Q19 where the G signal is clamped by the clamp pulse (CP) supplied to the base of Q19. The clamped G signal is then sent through buffer Q20 and white clip circuit Q21 to pin 4 of amplifier IC2 in the gain control circuit. The white clip circuit clips the signal which exceeds the specified level to prevent the polarity-inversion of G signal in the gain control circuit.

The G signal obtained at the emitter of Q20 is fed through pin 13 of CN1 to the feedback beam control circuit in the High voltage AIC board.

4-6-2 Gain Control Circuit

Outline

This circuit amplifies the G signal. The B and R signal is controlled to coincide the amplified G signal in level for the automatic white balance setting.

This circuit also sets the gain/amplitude of G signal to 0dB, +9dB or +18dB corresponding to the position of high gain selection switch on the side of camera.

Details

The G signal is supplied from the dark shading correction circuit to pin 4 of amplifier IC2. The gain of IC2 is controlled by the fixed DC voltage set by R145 and R146, and supplied to pin 6 of IC2.

The amplified G signal obtained at pin 7 of IC2 is fed through buffer Q23 to high gain control circuit consisting of Q24 - Q26. When the High Gain Selection Switch SW002 on the side of camera is selected to 0dB, +9dB or +18dB position, the DC potential supplied to cross-point of R61 and R62 through pin 19 of CN1 and High Gain Control Select circuit becomes +9V (open), 0V or -9V and Q25 and Q26 work as shown in the Table below.

Position of High Gain Selection Switch	Gain Control Voltage	Q25	Q26
0dB	+9V (OPEN)	OFF	ON
+9dB	0V	ON	ON
+18dB	–9V	ON	OFF

As a result, the gain of Q24 becomes minimum in the 0dB position of SW002. In the +9dB position, the gain of Q24 becomes three times of that in the 0dB position. In the +18dB position, the gain of Q24 becomes six times of that in the 0dB position.

The G signal thus controlled its gain is then fed to the Detail board through buffer Q27 and pin 24 of CN1.

4-7 R Shading Correction/Gain Control Circuit

This circuit consists of the dark shading correction circuit and gain control circuit as in the case of B and G shading correction/gain control circuit.

4-7-1 Dark Shading Correction Circuit

Outline

Refer to 4-5-1 Dark shading Correction Circuit for the blue(B) signal on page 13.

Details

This circuit is same as that for the B and G signal. The red(R) signal is supplied through pin 6 of CN1, buffer Q32 and VR11 (R INPUT GAIN) to emitter of shading correction/amplifier Q33. The R dark shading correction signal is sent from the R shading signal circuit to the emitter of Q33 where it is mixed with the R signal for correcting the dark shading. The R signal which undergoes the dark shading correction and is amplified by Q33 is sent to buffer Q35. The positive horizontal scanning start (Hs) pulse is fed to blanking cleaner Q34 to eliminate the noise during the blanking period. The R signal at the emitter of Q35 is fed to clamp circuit Q36 where the R signal is clamped by the clamp pulse (CP) supplied to the base of Q36. The clamped R signal is then sent through buffer Q37 and white clip circuit Q38 to pin 4 of amplifier IC3 in the gain control circuit. The white clip circuit clips the signal which exceeds the specified level to prevent the polarity-inversion of R signal in the gain control circuit.

The R signal obtained at the emitter of Q37 is fed through pin 9 of CN1 to the feedback beam control circuit in the High voltage AIC board.

4-7-2 Gain Control Circuit

Outline

This circuit changes the level of R signal by changing the B gain to coincide it with that of G signal for the automatic white balance setting.

This circuit also sets the gain/amplitude of B signal to 0dB, +9dB or +18dB corresponding to the position of high gain selection switch on the side of camera.

Details

The R signal is supplied from the dark shading correction circuit to pin 4 of amplifier IC3 which is a part of automatic white balance setting loop to match the R signal to the G signal in level by changing the gain of IC3. The gain of IC3 is controlled by the DC voltage supplied to pin 6 of IC3 from the Auto board through pin 5 of CN1 and the auto/manual selection switch SW1. When the SW1 is set to the manual position, the fixed voltage set by R139 and R140 is sent to IC3.

The amplified R signal obtained at pin 7 of IC3 is fed through buffer Q40 to high gain control circuit consisting of Q41 - Q43. When the High Gain Selection Switch SW002 on the side of camera is selected to 0dB, +9dB or +18dB position, the DC potential supplied to cross-point of R100 and R101 through pin 19 of CN1 and High Gain Control Select circuit becomes +9V (open), 0V or -9V and Q42 and Q43 work as shown in the Table below.

Position of High Gain Selection Switch	Gain Control Voltage	Q42	Q43
0dB	+9V (OPEN)	OFF	ON
+9dB	0V	ON	ON
+18dB	-9V	ON	OFF

As a result, the gain of Q41 becomes minimum in the 0dB position of SW002. In the +9dB position, the gain of Q41 becomes three times of that in the 0dB position. In the +18dB position, the gain of Q41 becomes six times of that in the 0dB position.
The B signal thus controlled its gain is then fed to the Process-2 board through buffer Q13 and pin 22 of CN1.

4-8 High Gain Switching Circuit

Outline
This circuit sends DC bias to the gain control corresponding to the position of gain switch on the side of the camera.
Also this circuit switches and send out automatic gain control signal, while AWC, ABC set switch on the front of the camera is switched to the AWC or ABC position.

Details
When the camera is used in normal operating condition, high voltage is supplied to base of Q55 through pin 18 of CN1 thus Q55, Q56 OFF and Q53 ON. Therefore high gain control signal at pin 19 of CN1 which level corresponding to the position of gain switch on the side of the camera as 0dB, +9dB and +18dB for 0V, +4.5V and +9.0V respectively is supplied to gain control circuit. However, while AWC, ABC Set Switch is set to AWC or ABC position, pin 18 of CN1 becomes low, as a result, Q55 and Q56 are turned ON, thus Q53 OFF and Q54 ON.
Therefore, automatic gain control signal at pin 12 of CN1 from Auto board is supplied to gain control circuit through Q54 for automatically setting the black and white level.

4-9 Blanking Offset Control Circuit

Outline
This circuit produces R, G and B blanking and dark signal correction current for dark shading correction.

Details
The DC bias made by the constant current circuit consisting of Q57 and Q58 is supplied to the R BLANKING OFFSET VR16, G.BLANKING OFFSET VR17 and B.BLANKING OFFSET VR18 respectively, and each controlled offset DC voltage of R, G and B is sent through analog switch IC4 to shading correction circuit. The thermistor which placed inside of deflection coil is connected other arm of VR16 - VR18 through pin 8 of CN1 and R172, therefore, depending on the variation of temperature, offset DC voltage is automatically controlled for compensate the drift of color shading by the temperature.

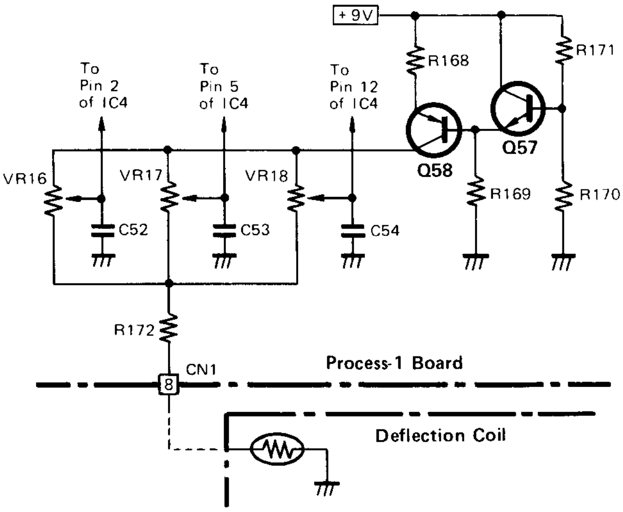

Fig. 4-9

10. Deflection Board

10-1 DC Regulator Circuit

Outline
This circuit generates +4.5V DC by regulating +9V DC. These DC voltages are used as subpower source.

Details
The +4.5V obtained by dividing +9V with R34 and R25 is fed to pin 3 of DC regulator IC8(a) as a reference voltage. The output voltages at pin 1 of IC8(a) are fed back to pin 2 for stabilizing the +4.5V DC.
These +4.5V are used in the vertical deflection circuit in the next.
The +4.5V is also generated by regulating +9V with the DC regulator circuit consisting of IC8(b), R72 and R73. They are used in the horizontal linearity circuit.

10-2 Alignment Circuit

The circuit description of Alignment Circuit is not applied for WV-555BN.

10-3 Horizontal Deflection Circuit

Outline

This circuit generates the sawtooth current for the horizontal(H) beam deflection inside the pick-up tube and supplies it to the horizontal deflection coil for the green(G), red(R) and blue(B) pick-up tubes.

Details

The negative horizontal scanning start (Hs) pulse is fed from pin 2 of CN4 to inverter Q4. The inverted Hs pulse obtained at the collector of Q4 is then supplied through switching amplifier Q5 to horizontal deflection output Q6. When Q6 is switched by the Hs pulse from Q5, the collector current of Q6 resonated with L1 and C28, and resultant horizontal sawtooth current is fed to the horizontal deflection coil for the G, R and B pick-up tubes through VL3 (G H.SIZE), VL4 (R H.SIZE) and VL5 (B H.SIZE) respectively. The DC voltage set by VR7 (TOTAL H.SIZE) is fed through buffer Q8 to the base of buffer Q7 to control the power supply voltage for Q6. As a result, the value of sawtooth current is changed. When SW2 (OVERSCAN SWITCH) is set to the OVERSCAN position, the base potential of Q8 increases. Therefore, the H sawtooth current increases for the H overscanning.

10-4 Horizontal Linearity Circuit

Outline

The horizontal(H) deflection circuit is of a switching type, so that the generated sawtooth current waveform has poor linearity. By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil is not linear as the pick-up tube's electron beam is deflected. If a linear sawtooth current Ⓐ is sent to the deflection coil, however, the magnetic field in the scanning start portion is distored Ⓑ due to the effect of the pick-up tube's electrodes, coil hysterisis, etc. As a result, the linearity of the scanning start portion deteriorates.

Therefore, in order to generate a linear magnetic field intensity Ⓓ and to correct the linearity of the scanning start portion, it is necessary to feed a nonlinear sawtooth signal Ⓒ to the deflection coil.

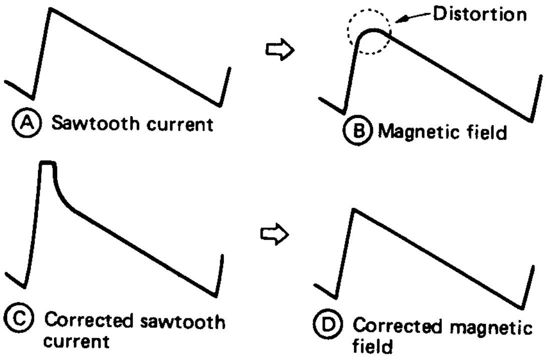

Fig. 10-4-1 Horizontal Linearity Correction-1

This circuit generates a waveform to correct the overall linearity of horizontal sawtooth current waveform and its starting portion. The horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity circuit to the other end. The same circuit is used for correcting the horizontal linearity of green(G), red(R) and blue(B) picture.

Details

This circuit contains the horizontal linearity circuit for G, R and B deflection.

- **G Horizontal Linearity Circuit**

The horizontal(H) flyback pulse Ⓔ produced from the collector of Q6 in the horizontal deflection circuit is integrated by L6, R48 and VR8 (G H.LIN2) into a sawtooth signal Ⓕ. This sawtooth signal is again integrated by L6, R50 and C35 into a parabola signal Ⓖ, which is applied through R49 to pin 2 of amplifier IC5(a) as a G H-linearity correction signal.

The H flyback pulse Ⓔ from Q6 is integrated by R54 and C36 into a linearity correction signal Ⓗ for correcting the linearity of the starting portion of H sawtooth current waveform. The signal Ⓗ is fed to pin 3 of IC5(a) where the linearity correction signal Ⓖ and Ⓗ are mixed and amplified.

The mixed signal Ⓘ of these correction signals at pin 1 of IC5(a) is fed through output transistor Q9/Q10 to the G H deflection coil to correct the linearity of the horizontal sawtooth current waveform.

VR8 (G H.LIN2) is a control for adjusting the overall linearity of sawtooth current and VR9 (G H.LIN1) for adjusting the H.linearity of the starting portion.

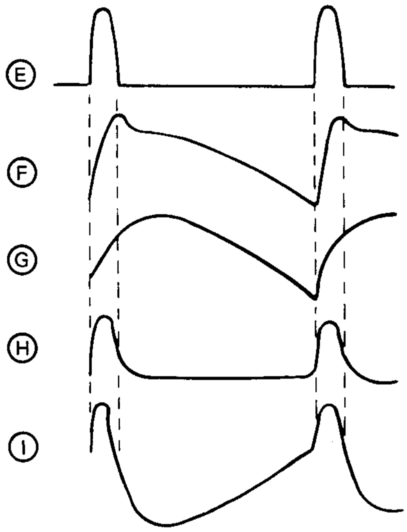

Fig. 10-4-2 Horizontal Linearity Correction-2

- **R Horizontal Linearity Circuit**

This circuit uses the same design as the G horizontal linearity circuit.
The H flyback pulse at the collector of Q6 in the horizontal deflection circuit is integrated by L7, R56 and VR10 (R H.LIN2) into a sawtooth signal. This sawtooth signal is again integrated by L7, R58 and C38 into a parabola signal, which is applied through R57 to pin 2 of IC6(a) as a R H-linearity correction signal.
The H flyback pulse from Q6 is integrated by R62 and C39 into a linearity correction signal for correcting the linearity of the starting portion of H sawtooth current waveform. This signal is fed to pin 3 of IC6(a) where the linearity correction signals are mixed and amplified.
The mixed signal of these correction signals at pin 1 of IC6(a) is fed through output transistor Q11/Q12 to the R H deflection coil to correct the linearity of the H sawtooth current waveform.
VR10 (R H.LIN2) is a control for adjusting the overall linearity of sawtooth current and VR11 (R H.LIN1) for adjusting the linearity of the starting portion.

- **B Horizontal Linearity Circuit**

This circuit uses the same design as the G horizontal linearity circuit.
The H flyback pulse at the collector of Q6 in the horizontal deflection circuit is integrated by L8, R64 and VR12 (B H.LIN2) into a sawtooth signal. This sawtooth signal is again integrated by L8, R66 and C40 into a parabola signal, which is applied through R65 to pin 2 of IC4(a) as a B H-linearity correction signal.
The H flyback pulse from Q6 is integrated by R70 and C41 into a linearity correction signal for correcting the linearity of the starting portion of H sawtooth current waveform. This signal is fed to pin 3 of IC4(a) where the linearity correction signals are mixed and amplified.
The mixed signal of these correction signals at pin 1 of IC4(a) is fed through output transistor Q13/Q14 to the B H deflection coil to correct the linearity of the H sawtooth current waveform.
VR12 (B H.LIN2) is a control for adjusting the overall linearity of sawtooth current and VR13 (B H.LIN1) for adjusting the linearity of the starting portion.

10-10 Centering/Skew Output Circuit

Outline

This circuit receives the skew signal and H centering DC voltages for the green(G), red(R) and blue(B) images and sends them to the respective H deflection coil.

Details

The DC voltage set by VR23 (G H.CENTERING) is fed through amplifier IC5(b) to the H deflection coil for the G pick-up tube.
The DC voltage which controls the H-centering of R image is sent from the centering control circuit to pin 5 of amplifier IC6(b) and it is mixed with the skew signal sent to pin 6 of IC6(b) from the skew circuit. The mixed signal at pin 7 of IC6(b) is then sent to the H deflection coil for the R pick-up tube. The DC voltage which controls the H-centering of B image is sent from the centering control circuit to pin 5 of amplifier IC4(b) and it is mixed with the skew signal sent to pin 6 of IC4(b) from the skew circuit. The mixed signal at pin 7 is forwarded to the H deflection coil for the B pick-up tube.

10-12 Target Voltage Control Circuit

Outline

This circuit supplies target voltage of each R, G and B pick-up tube.

Details

The DC bias made from +90V using by Q21 is supplied to the TARGET R VR1, TARGET G VR2 and TARGET B VR3 and each of VR1, VR2 and VR3 controls for setting the target voltage of Esj value for corresponding pick-up tube.
The thermistor which placed inside of deflection coil is connected other arm of VR1, VR2 and VR3 through pin 9 of CN2.
Therefore, depending on the variation of temperature, target voltage is automatically controlled for compensate the drift of resolution by the temperature.

11. High Voltage Board

11-1 High Voltage Circuit

Outline

This circuit generates high voltages needed for the red(R), green(G) and blue(B) pick-up tube. This circuit also stops generating the high voltages in order to protect the photoconductive layer of pick-up tube when the horizontal(H) and/or vertical(V) deflection circuit fails.

Details

The horizontal scanning start(Hs) pulse is fed through pin 8 of BI10 to pin 5 of monostable multivibrator IC6(a) where the horizontal drive (HD) pulse is generated. The HD pulse obtained at pin 7 of IC6(a) is fed through inverter Q1 to pin 1 of flip-flop IC1. The pulse whose frequency is divided into a half of HD frequency and duty is 50% - 50% is obtained at pin 2 of IC1 and supplied to phase splitter Q3. The positive and negative pulse are sent through driver Q4 and Q5 to converter transformer T1 where the input pulse is boosted.

The boosted pulse at pin 7 of T1 is rectified by D5 and D6, and +300V is generated. +300V is applied to grid-2 (G2) of red(R), green(G) and blue(B) pick-up tubes respectively. The pulse obtained at pin 8 of T1 is rectified by D7, D8, D11 and D12, and +1100V is made. Since the anode of D7 is connected to +300V line, the voltage at cathode of D12 becomes +1.4kV. +1.4kV is fed to grid-5 (G5) of pick-up tubes. +600V generated dividing +1.4kV with R15 - R18 is sent to grid-4 (G4). The voltages set by VR4 (R FOCUS), VR5 (G FOCUS) and VR6 (B FOCUS) are sent to grid-3 (G3) of pick-up tubes together with the dynamic focus signal supplied through C20 - C22. The step-up pulse at pin 6 of T1 is rectified by D10 generating -90V. The negative DC voltages set by VR1 (B BEAM), VR2 (G BEAM) and VR3 (R BEAM) are fed to grid-1 (G1) together with the feedback beam control signal supplied through C23 - C25. The +90V is made by rectifying the pulse at pin 6 of T1 with D9. +100V is also used in the cathode blanking circuit as a power source. +40V is generated by D3 and it is used in the feedback beam control circuit as a power source. It is also sent to AIC control circuit. -12V generated by D4 is sent to the -9V DC regulator circuit.

11-4 Cathode Blanking

Outline

This circuit generates the blanking pulse which is fed to the cathode of red(R), green(G) and blue(B) pick-up tubes to eliminate the retrace lines of scanning.

Details

The vertical scanning start (Vs) pulse is sent through pin 7 of BI10 to pin 11 of monostable multivibrator IC6(b) where the vertical blanking (V.BL) pulse is generated. The V BL pulse obtained at pin 9 of IC6(b) is fed to cathode blanking mixer Q16/Q17.

The horizontal scanning start (Hs) pulse is also fed through pin 8 of BI10 to cathode blanking mixer Q16/Q17 where it is mixed with the V BL pulse in order to make the composite cathode BL pulse. The composite cathode BL pulse at the emitter of Q16/Q17 is fed to cathode (K) of each pick-up tube through buffer Q18 - Q20 to eliminate the retrace line of scanning.

Vol. 2

This Service Manual contains only item 4 for Adjustment Procedure and Location of Test Points and Adjusting Controls. Please Refer to the Original Service Manual WV-555 Series for 1. Test Equipment Required, 2. Disassembling Procedure for Adjustment, 3. Pick-up tube Replacement, 5. Chip Components and 6 Cable information.

4. Adjustment Procedure

4-1 Connection and Setting Up for adjustment

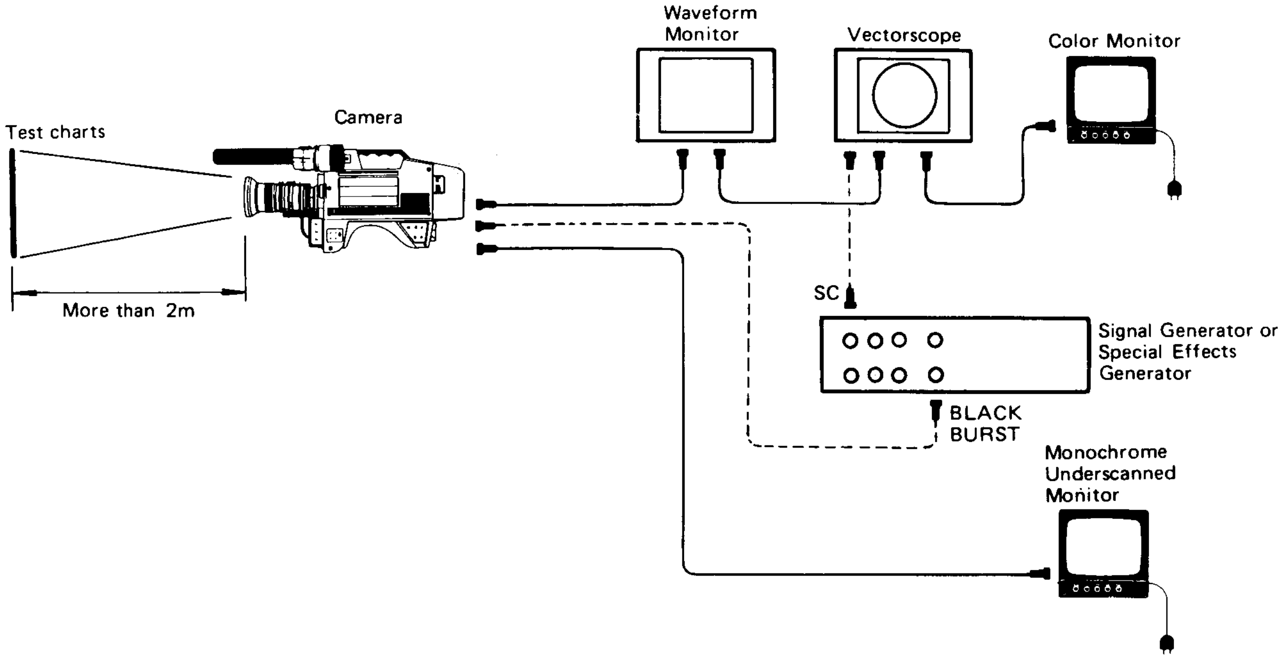

Fig. 4-1-1

Connection

- o Connect the VIDEO OUT connector on the rear of camera to the VIDEO IN connector of color video monitor through the waveform monitor and vectorscope using coaxial cables.
- o Terminate the video input of color video monitor with 75 ohms.
- o Connect the GEN-LOCK IN/PIX OUT connector on the rear of camera to the monochrome underscanned video monitor using a coaxial cable when instructed.
- o Connect the GEN LOCK IN/PIX OUT connector on the rear of camera to the BLACK BURST OUT or COLOR BAR OUTPUT of signal generator or special effect generator using a coaxial cable when instructed.
- o Terminate the video input of monochrome video monitor with 75 ohms.

Position of Controls and Switches on the Camera

(Right Side) - Viewed from front -
Filter Wheel ---------- 1
High Gain Selection Switch ---------- 0 dB
Color Bar/Camera Selection Switch ---------- CAMERA
Standby/Operate Selection Switch ---------- OPERATE
Auto/Manual Centering Selection Switch ---------- Manual
R-G/Y/B-G Selection Switch ---------- Y
LEVEL IND ON/OFF SWITCH ---------- OFF
(Lens)
Iris Control Selection Switch ---------- MAN
Servo/Manual Zoom Select Knob ---------- MANUAL
Flangeback Adjusting Ring ----------Standard (▶|●)
Lens Iris ---------- F4

Set-up

- o Turn on the color camera for at least 30 minutes prior to adjustment.
- o Distance between the camera and test chart should be more than 6 feet (2m).
- o Light : 140 footcandles (1400 lux) incident

Extension Board

- When adjusting the Process-1, Process-2, Encoder, Sync and Detail Boards, use the extension board (standard accessories as shown in Fig. 4-1-2.)

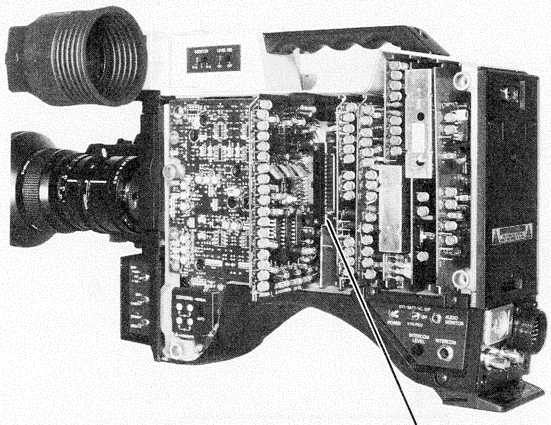

Fig. 4-1-2

4-2 Power Supply Adjustment

o Set the Detail ON/OFF switch on the Detail board to OFF position until Detail Board Adjustment (Step 4-9) is started.

(a) +9V adjustment (Mother board)

Test points :	TP4 (+9V)	Mother board
	TPE (GND)	Mother board
Adjust :	VR1 (+9V ADJ)	Mother board

o Connect the digital voltmeter (DVM) probe between TP4 and TPE (GND) on the mother board.

o Adjust +9V ADJ VR1 for +9V ± 0.02V.

(b) +5V adjustment (Mother board)

Test points :	TP6 (+5V)	Mother board
	TPE (GND)	Mother board
Adjust :	VR3 (+5V ADJ)	Mother board

o Connect the digital voltmeter (DVM) probe between TP6 and TPE (GND) on the mother board.

o Adjust +5V ADJ VR3 for +5.1V ± 0.1V.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(c) Pedestal preset adjustment (Mother board)

Test points :	TP5 (+7V)	Mother board
	TPE (GND)	Mother board
Adjust :	VR2 (+7V ADJ)	Mother board

o Connect the digital voltmeter (DVM) probe between TP5 and TPE (GND) on the Mother board.

o Adjust +7V ADJ VR2 for +7V ± 0.1V.

(d) Battery warning adjustment (Mother board)

Test points :	Pin 4 (+) of CN105	DC 4P Connector
	Chassis (GND)	
Adjust :	VR4 (BATTERY WARNING)	Mother board

o Disconnect the AC adaptor from the camera.

o Connect the DC power supply to the EXT DC INPUT on the rear of the camera.

o Supply +12V DC between pin 4 (+) and pin 1 (GND) of EXT DC INPUT on the rear of camera from the DC power supply. (Fig. 4-2-1)

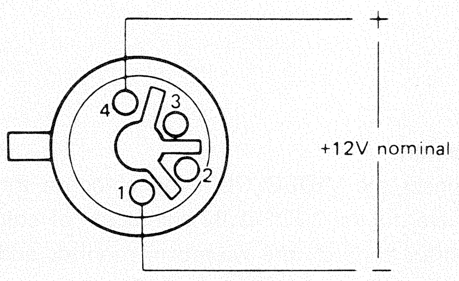

Fig. 4-2-1

o Connect the DVM probe between pin 4 (+) of EXT DC INPUT connector and chassis (GND) on the rear of camera.

o Set the DC power supply voltage so that voltage is 11.3V.

o Turn BATTERY WARNING VR4 fully clockwise and turn it back slowly and stop it when the battery warning indicator (BATT) in the 1.5 electronic viewfinder just blinks.

o Reduce the DC power supply voltage gradually from 14V and confirm that the battery warning signal appears and the battery warning indicator blinks when the voltage becomes 11.3V.

o Disconnect the DC power supply from the EXT DC INPUT of the camera.

o Mount the AC adaptor to the camera.

4-3 Sync Board Adjustment

(a) 4.43MHz adjustment

Test points :	TP28(SC)	Extension board
	TPG (GND)	Extension board
Adjust :	CT2 (4.43MHz ADJ)	Sync board

- Connect the frequency counter to TP28 (SC) and TPG (GND) on the extension board.
- Adjust 4.43MHz ADJ CT2 for 4.433618MHz ± 3Hz.

(b) Field detect adjustment

Test point :	TP5	Sync board
Adjust :	CT3 (FIELD DETECT)	Sync board

- Disconnect a color Bar or Black Burst signal to the GEN-LOCK connector on the rear of camera from the signal generator or special effects generator.
- Connect the oscilloscope to TP5.
- Trigger the oscilloscope at H rate (Use TP8 (HD) Mother board.).
- Set the input coupling selector of oscilloscope to DC position.
- Adjust FIELD DETECT CT3 for +1.8V DC.

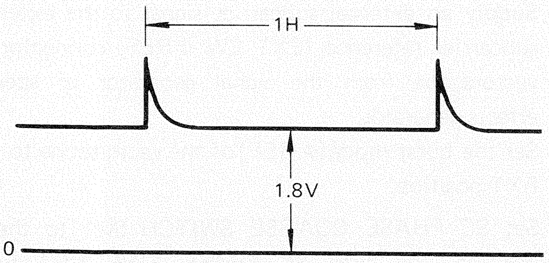

Fig. 4-3-1

(c) Horizontal lock adjustment

Test points :	TP13 (GEN-LOCK)	Extension board
	TP22 (COMPOSITE SYNC)	Extension board
	TP6 (PD EXT)	Sync board
Adjust :	CT4 (H, LOCK)	Sync board

- Supply the color bar or black burst signal from the special effect generator or signal generator to the GEN-LOCK connector on the rear of the camera.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- Connect the oscilloscope to TP6.
- Set the input coupling selector of oscilloscope to DC position.
- Adjust H. LOCK CT4 for 2.5V DC. (Fig. 4-3-2)
- Connect the oscilloscope to TP13 (G/L) and TP22 (C. SYNC) on the Extension board.
- Trigger the oscilloscope at H rate. (Use TP17 (HD) Mother board.)
- Expand the H sync period on the oscilloscope.

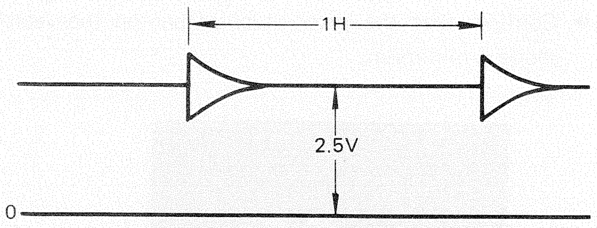

Fig. 4-3-2

- Confirm that signal at TP13 is stable. (Fig. 4-3-3)

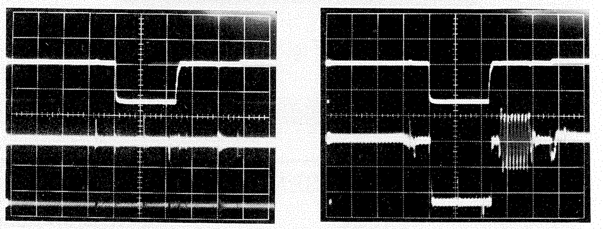
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Fig. 4-3-3

(d) Color lock adjustment

Test points :	VIDEO OUT	
	TP4 (PHASE)	Sync board
Adjust :	CT1 (COLOR LOCK)	Sync board
Observe :	Vectorscope	

- Supply the color bar or black burst signal from the special effect generator or signal generator to the GEN-LOCK connector on the rear of the camera.
- Supply the subcarrier (SC) signal from the special effect generator or signal generator to the EXT CW ϕ REF connector on the rear of the vectorscope and set the burst mode (ϕ REF) of the vectorscope to EXT position.
- Set the Color Bar/Camera Selection Switch on the side of camera to the BAR position.
- Connect the oscilloscope to TP4.
- Set the input coupling selector of oscilloscope to DC position.

- Adjust COLOR LOCK CT1 for 1.4V DC. (Fig. 4-3-4)

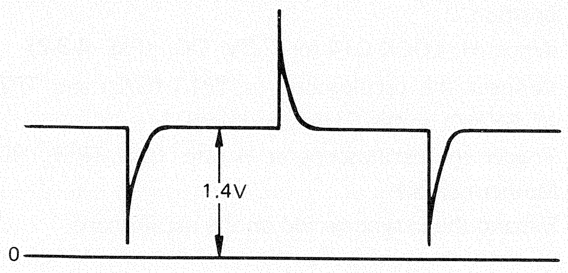


Fig. 4-3-4

- Confirm that the jitter of color bar on the vectorscope is minimum.

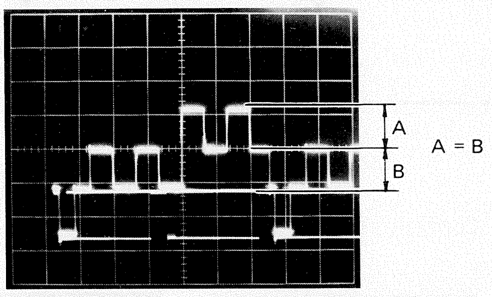


Fig. 4-3-5

(e) Horizontal phase adjustment

Test points:	TP13 (GEN-LOCK)	Extension board
	TP22 (COMPOSITE SYNC)	Extension board
Adjust:	VR2 (H. PHASE)	Sync board
	VR4 (H. PHASE SUB1)	Sync board
	VR5 (H. PHASE SUB2)	Sync board

- Keep the Color Bar or Black Burst signal connected as in the preceding step.
- Connect the oscilloscope to TP13 (G/L) and TP22 (C. SYNC) on the Extension board.
- Trigger the oscilloscope at H rate. (Use TP17 (HD) Mother board).
- Expand the H sync period on the oscilloscope.
- Adjust VR4 so that the phase of sync signal at TP13 shifts 4.0 ± 0.2μsec when H.PHASE VR2 is turned fully clockwise and counterclockwise.
- Turn H.PHASE VR2 fully clockwise and adjust VR5 so that the sync of gen-lock signal at TP13 lags 3.5μsec the sync signal at TP22.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

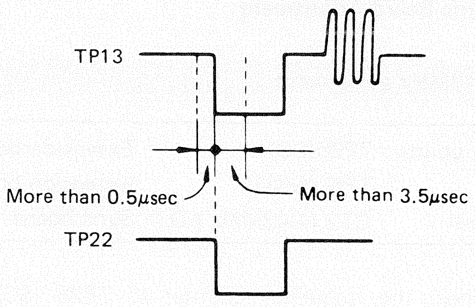


Fig. 4-3-6

- After confirming the above step, adjust VR2 so that the leading edges of both sync signals are coincident.

(f) Confirmation of subcarrier phase

Test point :	VIDEO OUT	
Adjusts :	SW1 (SC PHASE COARSE SWITCH)	Sync board
	VR1 (SC PHASE FINE)	Sync board
Observe :	Vectorscope	

- Connect the Color Bar or Black Burst signal connected to the GEN-LOCK connector as in the preceding step.
- Set the Color Bar/Camera Selection Switch set to the BAR position.
- Supply an external subcarrier signal to the external subcarrier reference (EXT CW ϕ REF) connector of vectorscope from the signal generator or special effects generator.
- Set the burst mode (ϕ REF) of the vectorscope to the EXT position.
- Set SC PHASE COARSE SWITCH SW1 to the 0° position and turn SC PHASE FINE VR1 fully counterclockwise.
- Confirm that the burst phase changes more than 90°, 180° and 270° when SC PHASE COARSE SWITCH SW1 is set to the 90°, 180° and 270° position. (Fig. 4-3-7)
- Confirm that the burst phase changes more than 90°, when VR1 is turned back. (The burst phase changes more than 360° by setting SW1 and VR1.)
- Reset SW1 to the 0° position and return VR1 fully counterclockwise.
- Disconnect the Color Bar or Black Burst signal from the GEN-LOCK connector, and the external subcarrier signal from the vectorscope.

Subcarrier Phase Coarse Switch Selection

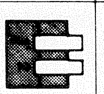
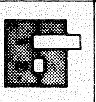
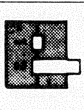
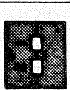
SC Phase	0°	90°	180°	270°
Position of Switches				

Fig. 4-3-7

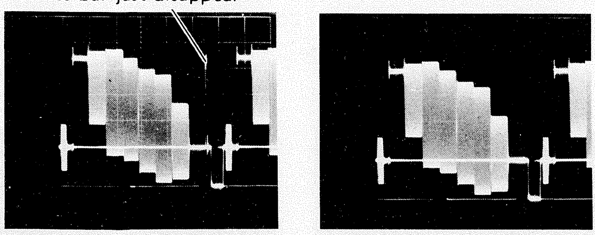
4-4 Encoder Board Adjustment

- Set the Color Bar/Camera Selection Switch to the BAR position.

(a) Color bar width adjustment

Test point :	VIDEO OUT	
Adjust :	VR1 (BAR WIDTH)	Encoder board
Observe :	Waveform monitor	

- Use the extension board for this adjustment.
- Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- Trigger the oscilloscope at H rate (Use TP8 (HD), Mother board.).
- Adjust BAR WIDTH VR1 so that the end of black bar portion coincides with the beginning of the horizontal blanking.


White bar just disappear

NO GOOD GOOD

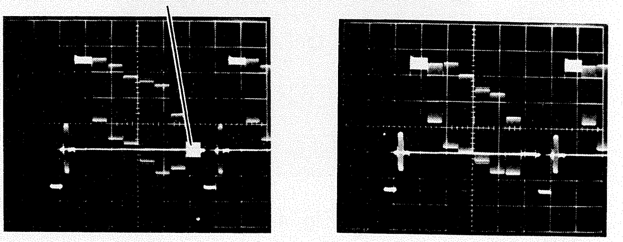
Fig. 4-4-1

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(b) Carrier balance and White balance adjustment

Test point :	VIDEO OUT	
Adjusts :	VR6 (V WHITE BALANCE)	Encoder board
	VR7 (U WHITE BALANCE)	Encoder board
	VR15 (V CARRIER BALANCE)	Encoder board
	VR16 (U CARRIER BALANCE)	Encoder board
Observe :	Waveform monitor	

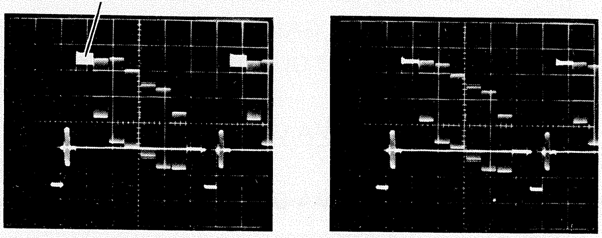
- Connect the oscilloscope to the terminated VIDEO OUT and trigger the oscilloscope at H rate (Use TP8 (HD), Mother board).
- Adjust V CARRIER BALANCE VR15 and U CARRIER BALANCE VR16 alternately so that the carrier on the black level of video signal becomes minimum. (Fig. 4-4-2)


Minimize the carrier

NO GOOD GOOD

Fig. 4-4-2

- Adjust V WHITE BALANCE VR6 and U WHITE BALANCE VR7 alternately so that the carrier on the white level of video signal becomes minimum. (Fig. 4-4-3)


Minimize the carrier

NO GOOD GOOD

Fig. 4-4-3

- Repeat adjusting VR15, VR16, VR6 and VR7 so that the carrier on the black and white level of video signal is minimum.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(c) Bar Pedestal, Y gain and Sync level adjustment

Test point :	VIDEO OUT	
Adjusts :	VR10 (Y GAIN)	Encoder board
	VR11 (BAR PEDESTAL)	Encoder board
	VR13 (SYNC LEVEL)	Encoder board
Observe :	Waveform monitor	

- Observe the waveform monitor, or connect the oscilloscope to the terminated VIDEO OUT and trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board).
- Adjust BAR PEDESTAL VR11 so that the pedestal level of color bar signal is 0V. (Fig. 4-4-4)
- Adjust Y GAIN VR10 so that the Y signal level of white bar signal is 0.7V. (Fig. 4-4-4)
- Adjust SYNC LEVEL VR13 so that the sync level is 0.3V. (Fig. 4-4-4)

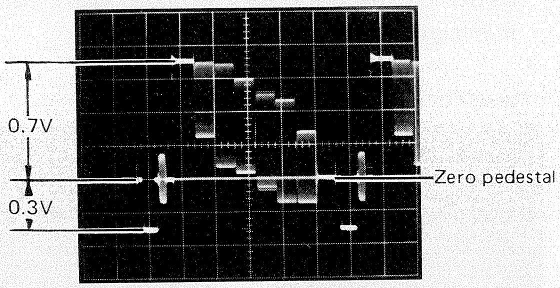


Fig. 4-4-4

(d) Chroma and Burst adjustment

Test point :	VIDEO OUT	
Adjusts :	VR4 (BURST GAIN)	Encoder board
	VR5 (BURST PHASE)	Encoder board
	VR8 (U GAIN)	Encoder board
	VR9 (SC QUAD)	Encoder board
	VR14 (CHROMA GAIN)	Encoder board
	VR17 (CHROMA DG/DP)	Encoder board
Observe :	Vectorscope	

- Insert the encoder board into the camera.
- Observe the vectorscope.
- Set the gain of vectorscope to 75%.
- Set the CHROMA DG/DP VR17 to its mechanical centre position.
- Turn the gain control of vectorscope to increase the burst vector for better viewing.
- Turn the phase control of vectorscope so that the burst vector for even line aligns with the U axis of the vectorscope. (Fig. 4-4-5)

Align the burst vector for even line with the U axis

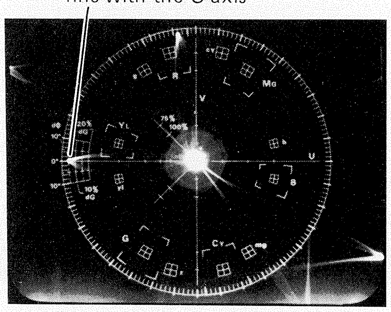
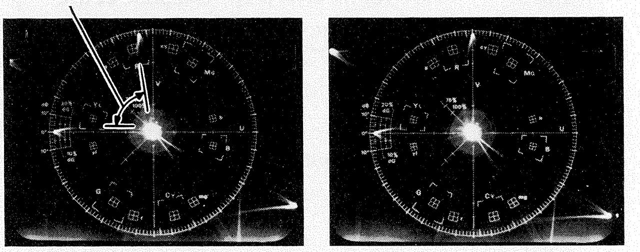


Fig. 4-4-5

- Adjust BURST PHASE VR5 so that the phase difference between the burst vectors for odd and even lines is 90°. (Fig. 4-4-6)

It should be 90°

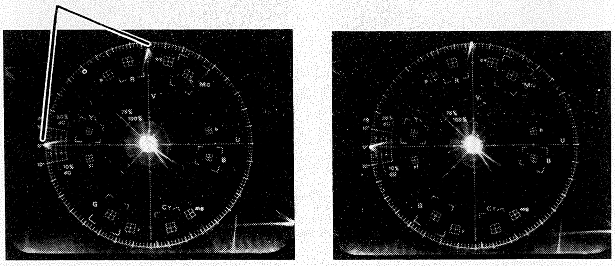


NO GOOD GOOD

Fig. 4-4-6

- Adjust SC QUAD VR9 so that the amplitude of the burst vector for odd and even lines are same. (Fig. 4-4-7) Use the gain control of vectorscope for confirming the amplitude.

Make the burst levels same



NO GOOD GOOD

Fig. 4-4-7

- Set the gain control of vectorscope to the calibration position.
- Turn the phase control of vectorscope so that the burst vectors position on the burst axes on the vectorscope. (Fig. 4-4-8)

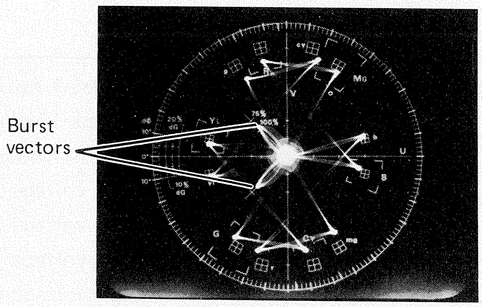


Fig. 4-4-8

- While paying attention on the red and green vectors, adjust CHROMA GAIN VR14 so that the red and green vectors fall into their respective boxes on the vectorscope. (Fig. 4-4-9)

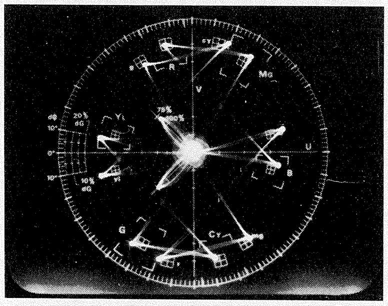


Fig. 4-4-9

- Adjust U GAIN VR8 so that the yellow and blue vectors fall into their respective boxes on the vectorscope. (Fig. 4-4-10)

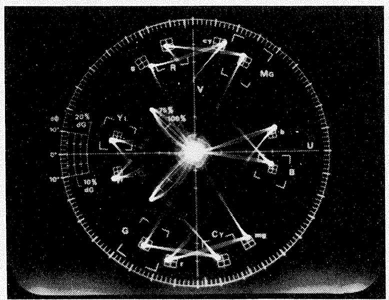
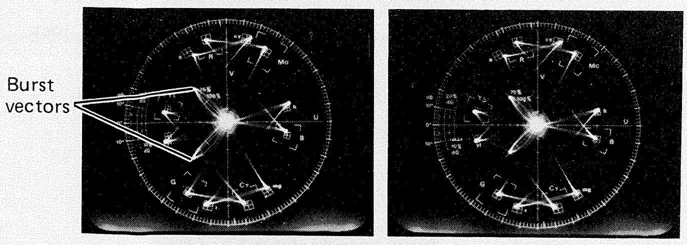


Fig. 4-4-10

- Repeat adjusting VR8, VR9 and VR14 so that all vectors fall into their respective boxes on the vectorscope.
- Adjust BURST GAIN VR4 so that the burst vectors position at 75% on the burst axes. (Fig. 4-4-11)



NO GOOD

GOOD

Fig. 4-4-11

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(e) REG BALANCE adjustment

Test point :	PIX/GEN-LOCK	Encoder board
Adjust :	VR2 (REG. BALANCE)	Encoder board

- o Set the Monitor/PIX select switch to the B-G position.
- o Observe the waveform monitor, or connect the oscilloscope to the terminated PIX/GEN-LOCK and trigger the oscilloscope at H rate. (Use TP8(HD) Mother board.)
- o Adjust REG BALANCE VR2 so that the video signal level center to top of video signal and bottom of video signal is same level as shown in Fig. 4-4-9.

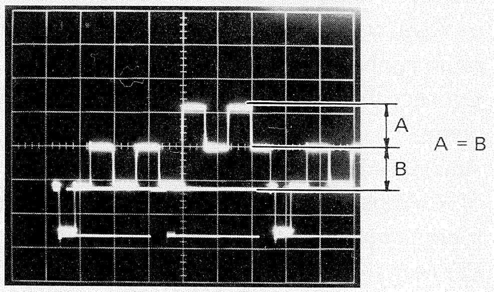


Fig. 4-4-9

(f) PIX OUTPUT PEDESTAL adjustment

Test point :	PIX/GEN-LOCK	Encoder board
Adjust :	VR3 (REG PEDESTAL)	Encoder board

- o Observe the waveform monitor, or connect the oscilloscope to the terminated PIX/GEN-LOCK and trigger the oscilloscope at H rate. (Use TP8(HD) Mother board.)
- o Adjust REG PEDESTAL VR3 so that the video signal pedestal level is 0.35V as shown in Fig. 4-4-10.

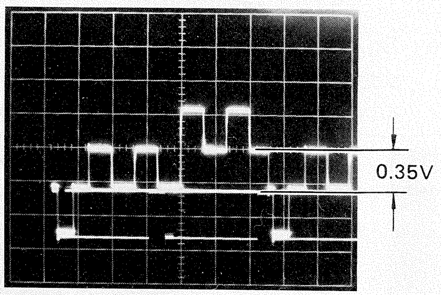


Fig. 4-4-10

4-5 Deflection and High Voltage AIC Board Adjustment

- o Refer to the separate booklet for the test points and adjusting controls.

(a) Target voltage adjustment

Test points :	pin 1 of CN7	Deflection board
	Pin 1 of CN8	Deflection board
	Pin 1 of CN9	Deflection board
Adjusts :	VR1 (TARGET R)	Deflection board
	VR2 (TARGET G)	Deflection board
	VR3 (TARGET B)	Deflection board

- o Connect the digital voltmeter (DVM) to pin 1 of CN9 on the Deflection board.
- o Adjust TARGET R VR1 so that the voltage at pin 1 of CN9 becomes following voltage, depends on the room temperature.
- o Connect the DVM to pin1 of CN8 on the Deflection board.
- o Adjust TARGET G VR2 so that the voltage at pin 1 of CN8 becomes following voltage, depends on the room temperature.
- o Connect the DVM to pin 1 of CN7 on the Deflection board.
- o Adjust TARGET B VR3 so that the voltage at pin 1 of CN7 becomes following voltage, depends on the room temperature.

Room Temperature	Target Voltage
Between −10°C and − 5°C	1.48 x Esj V
Between − 5°C and 0°C	1.38 x Esj V
Between 0°C and 5°C	1.29 x Esj V
Between 5°C and 10°C	1.22 x Esj V
Between 10°C and 15°C	1.16 x Esj V
Between 15°C and 20°C	1.08 x Esj V
Between 20°C and 30°C	1.00 x Esj V
Between 30°C and 40°C	0.92 x Esj V
Between 40°C and 50°C	0.86 x Esj V
More than 50°C	0.80 x Esj V

Table 4-5-1

Note : Esj value of each pick-up tube is shown at the side of the coil housing assembly or stamped on the neck of pick-up tube.

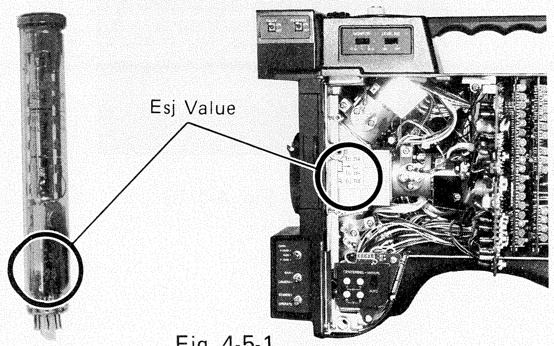


Fig. 4-5-1

(b) Focus adjustment

Test points :	TP1 (G)	Process-1 board
	TP2 (R)	Process-1 board
	TP3 (B)	Process-1 board
Adjusts :	VR4 (R FOCUS)	High voltage board
	VR5 (G FOCUS)	High voltage board
	VR6 (B FOCUS)	High voltage board
	VR11 (DYNAMIC FOCUS)	High voltage board
	Backfocus adjusting screws	
Observe :	Monochrome underscanned video monitor	

- o Set the flangeback adjusting ring on the lens to the standard position after loosening the flangeback lock knob. (Fig. 4-5-2)

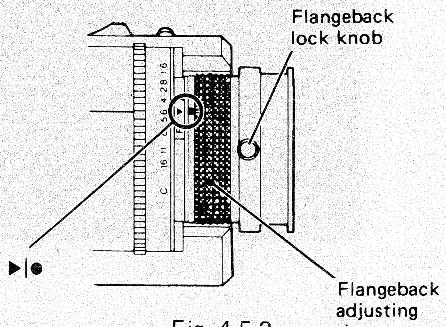


Fig. 4-5-2

- o Turn DYNAMIC FOCUS VR11 on the High voltage and AIC board fully counterclockwise.
- o Set OVERSCAN SWITCH SW1 on the Deflection board to NORMAL position.
- o Connect the PIX/GEN-LOCK connector on the rear of camera to the monochrome underscanned video monitor.
- o Aim the camera at the resolution chart or in-mega chart further than 6 feet (2m) from the camera.

- o G focus adjustment
- o Set the Monitor/PIX Select Switch to the R-G position.
- o Connect the capacitor 100uF 10V between TP2(R) (+lead) and the ground (-lead) on the Process-2 board.
- o Loosen the G coil lock screw (G LOCK) slightly. (Fig. 4-5-3)

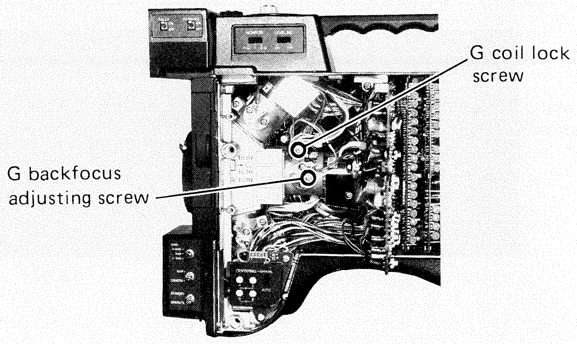


Fig. 4-5-3

- Set the lens iris to fully open in order to have minimum depth of focus (depth of field). If the picture on the monochrome video monitor is saturated, set the filter wheel on the side of camera to the position 2.
- Connect the oscilloscope to TP1(G) on the Process-1 board.
- Trigger the oscilloscope at H rate. (Use TP8 (HD), on the Mother board.)
- Zoom in (close up) and adjust the lens focus so that the modulation depth at the center of the picture becomes maximum.
- Zoom out (wide angle) and adjust the focus by turning the G backfocus adjusting screw (G BACKFOCUS).
- Zoom in again and adjust the lens focus. (Adjust G FOCUS VR5 on the High voltage board if the electrical focus is excessively out of focus.)
- Zoom out again and adjust the focus by turning the G backfocus adjusting screw.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Reset the lens iris to F4 and the filter wheel to the position 1.
- Aim the camera at the resolution or in-mega chart so aht the chart will fully occupies the screen of monitor.
- Adjust G FOCUS VR5 to obtain best focus at the center of picture. When the in-mega chart is used for the focus adjustment, the modulation depth at the center of in-mega signal becomes maximum at the best focus. (Fig. 4-5-4)

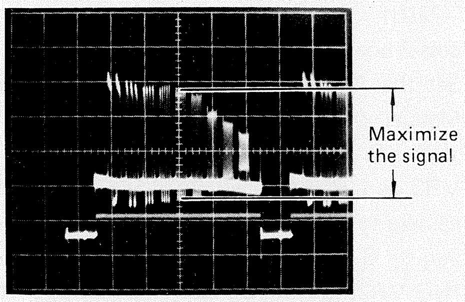


Fig. 4-5-4

- Pan the camera and 6MHz on the in-mega chart is positioned on the corner of picture.
- Adjust DYNAMIC FOCUS VR11 for the best focus on the corner.
- Readjust G FOCUS VR5 and DYNAMIC FOCUS VR11 alternately to obtain best focus throughout the picture. (Fig. 4-5-3)
- Tighten the G coil lock screw (G LOCK) and make sure that the focus remains properly adjusted.
- Disconnect the capacitor from TP2(R) on the Process-2 board.

- R focus adjustment
- Set the Monitor/PIX Select Switch to R-G position.
- Connect the capacitor 100uF 10V between TP1(G) (+lead) and the ground (-lead) on the Process-2 board.
- Connect the oscilloscope to TP2(R) on the Process-1 board.
- Trigger the oscilloscope at H.rate. (Use TP8(HD) on the Mother board.)
- Set the filter wheel on the side of camera to the position 2 and the lens iris to fully open in order to have minimum depth of focus.
- Zoom in (close up) while observing the monochrome underscanned video monitor.
- Loosen the R coil lock screw (R LOCK) slightly. (Fig. 4-5-5)

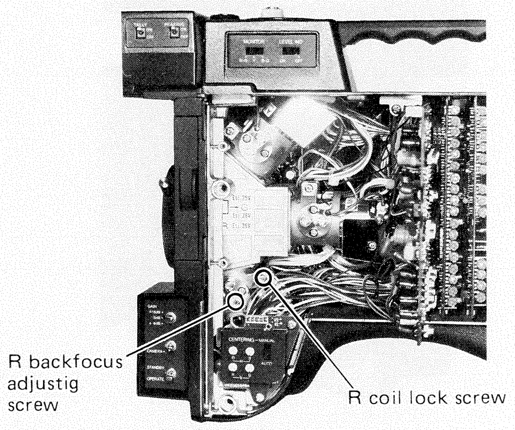


Fig. 4-5-5

- Adjust the focus by turning the R backfocus adjusting screw (R BACKFOCUS) (Fig. 4-5-4) while observing the oscilloscope.

  Note : Do not adjust the lens focus when adjusting the R backfocus.
- Reset the filter wheel to the position 1 and the lens iris to F4.
- Adjust R FOCUS VR4 to obtain best focus at the center of picture. When the in-mega chart is used for the focus adjustment, the modulation depth at the center of in-mega signal becomes maximum at the best focus. (Fig. 4-5-4)
- Repeat adjusting the R backfocus adjusting screw and R FOCUS VR4 to obtain best focus.
- Tighten the R coil lock screw (R LOCK) and make sure that the focus remains properly adjusted.
- Disconnect the capacitor 100uF 10V from TP1(G) on the Process-2 board.

- B focus adjustment
- Set the Monitor/PIX Select Switch to the B-G position.
- Connect the capacitor 100uF 10V between the TP1(G) (+lead) and the ground (-lead) on the Process-2 board.

- o Connect the oscilloscope to TP3(B) on the Process-1 board.
- o Trigger the oscilloscope at H.rate. (Use TP8(HD) on the Mother board.)
- o Set the filter wheel on the side of camera to the position 2 and the lens iris to fully open in order to have minimum depth of focus.
- o Zoom in (close up) and adjust the lens focus so that the modulation depth at the center of picture becomes maximum.
- o Loosen the B coil lock screw (B.LOCK) slightly. (Fig. 4-5-6)

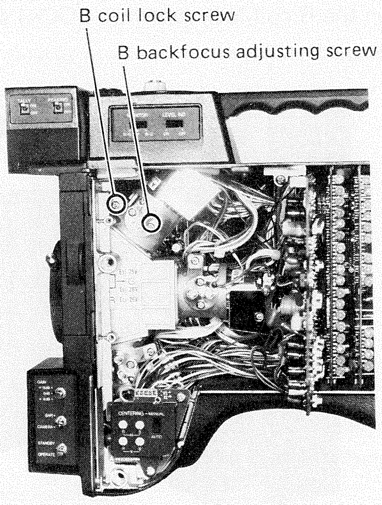


Fig. 4-5-6

- o Adjust the focus by turning the B backfocus adjusting screw (B BACKFOCUS) while observing the oscilloscope. (Fig. 4-5-6)
  Note : Do not adjust the lens focus when adjusting the B backfocus.
- o Reset the filter wheel to the position 1 and the lens iris to F4.
- o Adjust B FOCUS VR6 to obtain best focus at the center of picture. When the in-mega chart is used for the focus adjustment, the modulation depth at the center of in-mega signal becomes maximum at the best focus. (Fig. 4-5-4)
- o Repeat adjusting the backfocus adjusting screw and B FOCUS VR6 to obtain best focus.
- o Tighten the B coil lock screw (B LOCK) and make sure that the focus remains properly adjusted.
- o Disconnect the capacitor 100uF 10V from TP1(G) on the Process-2 board.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(c) Horizontal and vertical size adjustment

Adjusts :	VR7 (TOTAL H-SIZE)	Deflection board
	VL3 (G H-SIZE)	Deflection board
	VL4 (R H-SIZE)	Deflection board
	VL5 (B H-SIZE)	Deflection board
	VR19 (TOTAL V-SIZE)	Deflection board
	VR20 (R V-SIZE)	Deflection board
	VR21 (B V-SIZE)	Deflection board
	VR23 (G H-CENTERING)	Deflection board
	VR22 (G V-CENTERING)	Deflection board
	VR24 (R H-CENTERING)	Deflection board
	VR25 (R V-CENTERING)	Deflection board
	VR26 (B H-CENTERING)	Deflection board
	VR27 (B V-CENTERING)	Deflection board
Observe :	Monochrome underscanned video monitor	

- o Connect the PIX/GEN-LOCK connector to the monochrome underscanned video monitor.
- o Set the Monitor/PIX Select Switch to R-G position and then set OVERSCAN SWITCH SW1 on the Deflection board to the OVERSCAN position.
- o Connect the capacitor 100uF 10V between the TP2(R) (+lead) and the ground (-lead) on the Process-2 board.
- o Set the Auto-Manual Centering Select Switch to the Manual position and MANUAL B V-CENTERING VR1, R V-CENTERING VR2, B H-CENTERING VR3 and R H-CENTERING VR4 on the side of the camera to their mechanical center position.
- o Adjust G H-CENTERING VR23 and G V-CENTERING VR22 on the Deflection board so that the target ring (edge) of G pick-up tube is observed equally at the four corners of underscanned monitor. (Fig. 4-5-7)
  Note : If the target ring (edge) of G pick-up tube can not be observed, adjust TOTAL H-SIZE VR7 and TOTAL V-SIZE VR19.

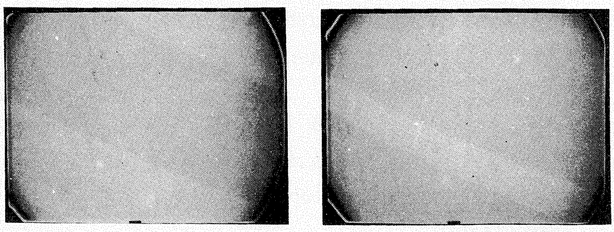

NO GOOD GOOD

Fig. 4-5-7

- Aim the camera at the registration chart and adjust the zoom lens so that the diagonal of chart is 95% of pick-up tube diameter. (Fig. 4-5-8)

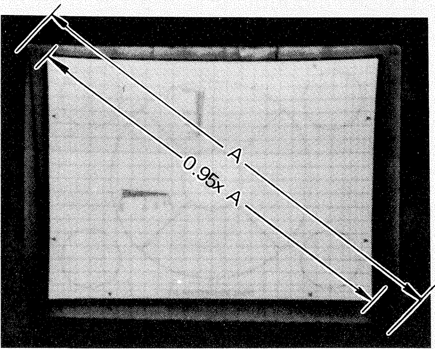


Fig. 4-5-8

- Reset the OVERSCAN SWITCH SW1 to the NORMAL position.
- Adjust TOTAL H-SIZE VR7 and TOTAL V-SIZE VR19 so that the reference arrow heads in the registration chart line up with the edge of the raster on the monochrome underscanned video monitor. (Fig. 4-5-9)

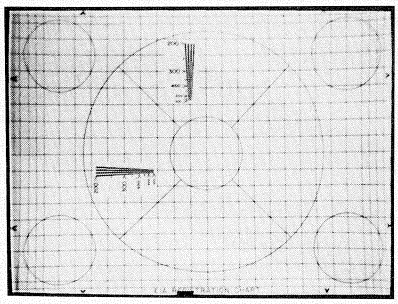
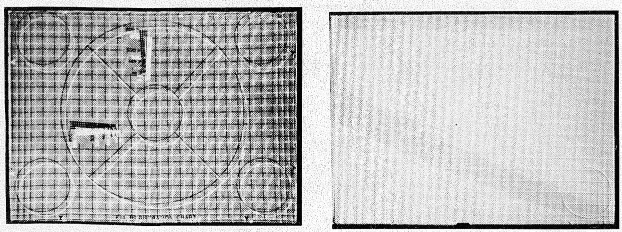


Fig. 4-5-9

- Disconnect the capacitor 100uF 10V from TP2(R) on the Process-2 board.
- Adjust R H-CENTERING VR24, R V-CENTERING VR25, R H-SIZE VL4 and R V-SIZE VR20 so that the red (Black line) and green (White line) pictures roughly coincide with each other over the entire raster. (Fig. 4-5-10)



NO GOOD GOOD

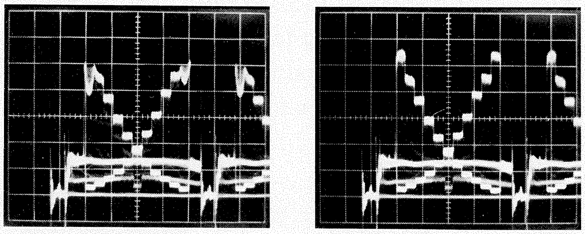
Fig. 4-5-10

- Set the Monitor/PIX Select Switch to B-G position.
- Adjust B H-CENTERING VR26, B V-ENTERING VR27, B H-SIZE VL5 and B V-SIZE VR21 so that the blue (Black line) and green (White line) pictures roughly coincide with each other over the entire raster.

(d) G beam current adjustment

Test point :	TP1 (G)	Process-1 board
Adjusts :	VR2 (G BEAM)	High voltage board
	VR8 (G FBC LEVEL)	High voltage board

- Turn G FBC LEVEL VR8 on the High voltage board fully clockwise to minimize the feedback level. This control will be adjusted after completing 4-9 (f) White clip adjustment on page 33.
- Aim the camera at the gray scale chart which is illuminated with 140 footcandles (1400 lux) and set the lens iris to F4.
- Connect the oscilloscope to TP1 (G) on the Process-1 board.
- Trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- Turn G BEAM VR2 fully counterclockwise first. Then turn it back slowly and stop at a point where the white chip (top step) of gray scale waveform just appears completely. (Fig. 4-5-10)



NO GOOD GOOD

Fig. 4-5-11

(e) G beam alignment adjustment

- Prepare a low-frequency sine wave oscillator hooking a 0.47uF/600V capacitor in series with its output.
- Set the frequency in the range of 10 to 30Hz.
- Adjust the signal level when necessary while watching the monitor.
- Set the lens iris to F4, and aim the camera at the registration chart.

Test point :	Pin 3 of BI16	High voltage board
Adjust :	Alignment magnets	Coil assembly
Observe :	Monochrome underscanned video monitor	

- Feed the oscillator's output through the 0.47uF capacitor to pin 3 of BI16 on the High voltage board. The registration chart on the monitor will move horizontally, vertically or diagonally.
- Set the monitor/PIX select switch to R-G position.
- Connect the capacitor 100uF 10V between the TP2(R) (+lead) and the ground (-lead) on the Process-2 board.
- Adjust alignment magnets, so that the registration chart will not move in the vertical and horizontal direction.
- Repeat adjusting alignment magnets so that the movement of registration chart, especially at the center, on the monitor is minimum. (Fig. 4-5-12)

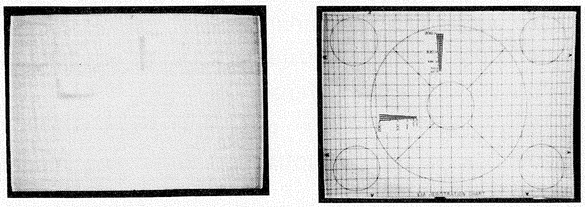

NO GOOD GOOD

Fig. 4-5-11

- When a low frequency oscillator is not available, turn the focus control VR5 for the G focus on the High voltage board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section.
  After adjustment, the focus control VR5 should be readjusted while referring to to (b) Focus adjustment on page 14. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)

(f) G centering adjustment

Adjusts : VR23 (G H-CENTERING) Deflection board
VR22 (G V-CENTERING) Deflection board
Observe : Monochrome underscanned video monitor

- Connect the PIX/GEN-LOCK connector to the monochrome underscanned monitor.
- Set the monitor/PIX select switch to R-G position.
- Connect the capacitor 100uF 10V between the TP2(R) (+lead) and the ground (-lead) on Process-2 board.
- Aim the camera at the registration chart and set the lens iris to F4.
- Set the OVERSCAN SWITCH SW1 on the Deflection board to the OVERSCAN position.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- Adjust G H-CENTERING VR23 and G V-CENTERING VR22 so that the target ring (edge) of G pick-up tube is equally observed at the four corners of underscanned video monitor. (Fig. 4-5-13)

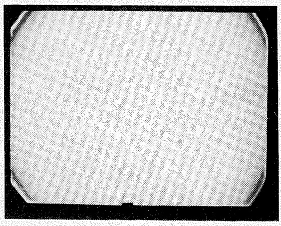


Fig. 4-5-12

- Reset the OVERSCAN SWITCH to the NORMAL position.

(g) G deflection coil rotation adjustment

Adjust : G coil rotation screw
Observe : Monochrome underscanned video monitor

- Aim the camera at the linearity chart and set the lens iris to F4.
- Connect the VIDEO OUT connector to the GEN-LOCK INPUT of the crosshatch generator and Comp Sync OUTPUT of the crosshatch generator to the EXT SYNC INPUT of monochrome underscanned video monitor.

  Connect the PIX/GEN-LOCK connector and video output of crosshatch generator to the video input of monochrome underscanned video monitor. (Fig. 4-5-13)
- Make sure that the camera is level with the chart.
- Set the Monitor/PIX Select Switch to R-G position.
- Connect the capacitor 100μF 10V to TP2 (R) on Process-2 board (+ lead) and ground (- lead).
- Confirm that the horizontal line of crosshatch pattern is parallel with balls on the linearity chart.

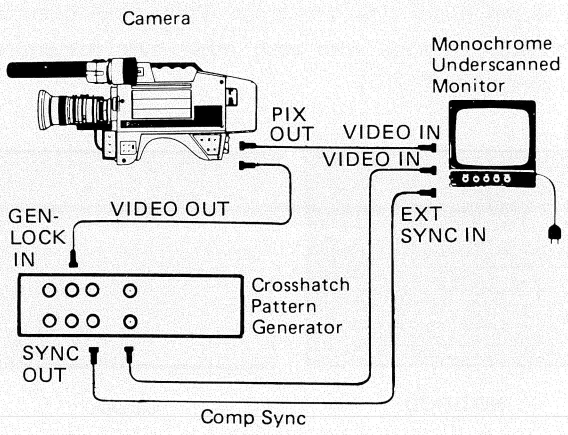


Fig. 4-5-13

- If not; loosen the G coil lock screw (G LOCK) slightly and turn the G coil rotation screw (G ROTATION) slowly and carefully (Fig. 4-5-14) so that the balls in horizontal direction on the EIA linearity chart is parallel with the horizontal line of crosshatch pattern. (Fig. 4-5-15)

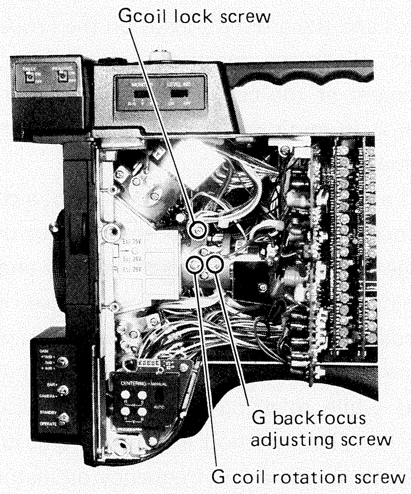


Fig. 4-5-14

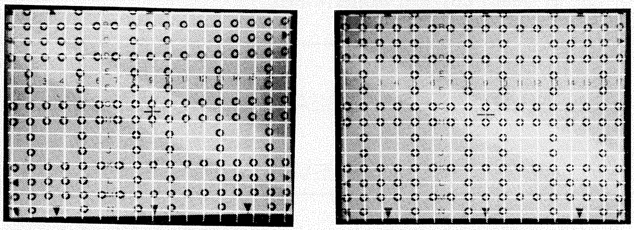

NO GOOD GOOD

Fig. 4-5-15

- Confirm that the G backfocus remains properly adjusted. If not, readjust the G backfocus screw (G BACKFOCUS) (Fig. 4-5-14) to obtain the best focus. Refer to the G focus adjustment.
- Tighten the G coil lock screw (G LOCK).

(h) Linearity adjustment

Adjusts :	VR8 (G H-LIN1)	Deflection board
	VR9 (G H-LIN2)	Deflection board
	VR14 (TOTAL V-LIN)	Deflection board
Observe :	Monochrome underscanned video monitor	

- Keep the VIDEO OUT connector to the GEN LOCK INPUT of the crosshatch generator and Comp Sync OUTPUT of the crosshatch generator to the EXT INPUT of monochrome underscanned video monitor and PIX/GEN LOCK connector and video output of crosshatch generator to the video input of monochrome underscanned video monitor.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- Set the Monitor/PIX Select Switch to R-G position.
- Connect the capacitor 100μF 10V to TP2 (R) on Process-2 board (+ lead) and ground (- lead).
- Aim the camera at the linearity chart and set the lens iris to F4.
- Line up the reference allow heads with edges of the raster on the underscanned monitor. (Fig. 4-5-16)

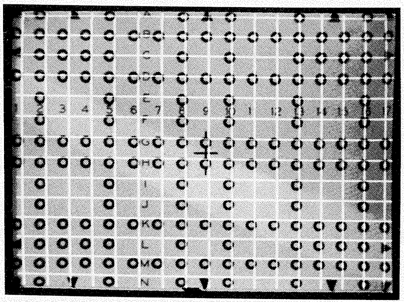


Fig. 4-5-16

- Confirm that the center of linearity chart is aligned with the center of crosshatch pattern. If needed, adjust vertical and horizontal position of crosshatch pattern on the generator. (Fig. 4-5-17)

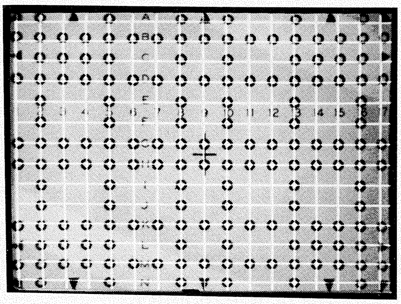


Fig. 4-5-17

o Adjust G H-LIN1 VR8, G H-LIN2 VR9 and TOTAL V-LIN VR14 so that each center (black) portion of ball on the linearity chart aligns with each cross point of the crosshatch pattern. (Fig. 4-5-18)

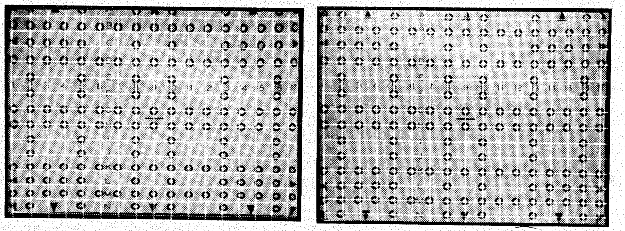

NO GOOD GOOD

Fig. 4-5-18

o Disconnect the video output connector of crosshatch generator from the monochrome underscanned monitor.

(i) R beam current adjustment

Test points :	TP2 (R)	Process-1 board
Adjusts :	VR3 (R BEAM)	High voltage board
	VR7 (R FBC LEVEL)	High voltage board

- o Aim the camera at the gray scale chart which is illuminated with 140 footcandles (1400 lux) and set the lens iris to F2.8.
- o Connect the oscilloscope to TP2 (R) on the Process-1 board.
- o Turn R FBC LEVEL VR7 on the High voltage board fully clockwise.
- o Trigger the oscilloscope at H.rate. (Use TP8(HD) Mother board.)
- o Turn R BEAM VR3 fully counterclockwise first, then turn it back slowly and stop at the point where the white chip (top step) of gray scale waveform just appears completely. (Fig. 4-5-10)

(j) R centering adjustment

Adjusts :	VR24 (R H-CENTERING)	Deflection board
	VR25 (R V-CENTERING)	Deflection board
Observe :	Monochrome underscanned video monitor	

- o Aim the camera at the registration chart and set the lens iris to F4.
- o Connect PIX/GEN-LOCK connector to the underscanned monochrome monitor.
- o Set the monitor/PIX select switch to R-G position.
- o Adjust R H-CENTERING VR24 and R V-CENTERING VR25 so that the registration of the center portion between Red and Green coincide roughly.

(k) R beam alignment adjustment

- o Prepare a low-frequency sine wave oscillator hooking a 0.47uF/600V capacitor in series with its output.
- o Set the frequency in the range of 10 to 30Hz.
- o Adjust the signal level when necessary while watching the monitor.
- o Set the lens iris to F4, and aim the camera at the registration chart.

Test point :	Pin 3 of BI17	High voltage board
Adjusts :	Alignment magnets	Coil assembly
Observe :	Monochrome underscanned video monitor	

- o Feed the oscillators output through 0.47uF capacitor to pin 4 of BI17 on the High voltage board. The registration chart on the monitor will move horizontally, vertically or diagonally.
- o Set the Monitor/PIX Select Switch to the R-G position.
- o Connect the capacitor 100uF 10V between TP1(G) (+lead) and the ground (-lead) on the Process-2 board.
- o Adjust alignment magnets repeatedly so that the movement at the center of registration chart on the monitor is minimum as in the case of the G beam alignment adjustment.
- o When a low-frequency oscillator is not available, turn the focus control VR4 for the R focus on the High voltage board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section. After adjustment the focus controls VR4 should be readjusted while referring to (b) Focus adjustment on page 14. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)
- o Reset Monitor/PIX Select switch to Y position.

(l) B beam current adjustment

Test point :	TP3 (B)	Process-1 board
Adjusts :	VR1 (B BEAM)	High voltage board
	VR9 (B FBC LEVEL)	High voltage board

- o Turn B FBC LEVEL VR9 on the High voltage board full counterclockwise to minimize the feedback level.
- o Aim the camera at the gray scale chart which is illuminated with 140 footcandles (1400 lux) and set the lens iris to F2.8.
- o Connect the oscilloscope to TP3 on the Process-1 board.
- o Trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Turn B BEAM VR1 fully counterclockwise and turn it back slowly and stop at a point where the white chip (top step) of gray scale waveform just appears completely. (Fig. 4-5-10)

(m) B centering adjustment

Adjusts :	VR26 (B H-CENTERING)	Deflection board
	VR27 (B V-CENTERING)	Deflection board
Observe :	Monochrome underscanned video monitor	

- o Connect PIX/GEN-LOCK connector to the video input of the monochrome underscanned monitor.

- Aim the camera at the registration chart and set the lens iris to F4.
- Adjust B H-CENTERING VR26 and B V-CENTERING VR27 so that the registration of the center portion between Blue and Green coincide roughly.

(n) B beam alignment adjustment

- Prepare a low-frequency sine wave oscillator hooking a 0.47uF/600V capacitor in series with its output.
- Set the frequency in the range of 10 to 30Hz.
- Adjust the signal level when necessary while watching the monitor.
- Set the lens iris to F4, and aim the camera at the registration chart.

Test point :	Pin 3 of BI15	High voltage board
Adjusts :	Alignment magnets	Coil Assembly
Observe :	Monochrome underscanned video monitor	

- Set the Monitor/PIX select switch to the B-G position.
- Connect the capacitor 100uF 10V between the TP1(G) (+lead) and the ground (-lead) on the Process-2 board.
- Feed the oscillators output through 0.47uF capacitor to pin 4 of BI15 on the High voltage board. The registration chart on the monitor will move horizontally, vertically or diagonally.
- Adjust alignment magnets so that the movement at the center of registration chart on the monitor is minimum as in the case of the G and R beam alignment adjustment.
- When a low-frequency oscillator is not available, turn the focus control VR6 for the B channel on the High voltage board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section. After adjustment, the focus controls VR6 should be readjusted while referring to (b) Focus adjustment. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)

(o) Red registration adjustment

Adjusts :	R coil rotation screw	
	VL4 (R H-SIZE)	Deflection board
	VR10 (R H-LIN1)	Deflection board
	VR11 (R H-LIN2)	Deflection board
	VR20 (R V-SIZE)	Deflection board
	VR17 (R V-LIN)	Deflection board
	VR16 (R SKEW)	Deflection board
	VR24 (R H-CENTERING)	Deflection board
	VR25 (R V-CENTERING)	Deflection board
Observe :	Monochrome underscanned video monitor	

- Set the Monitor/PIX Select Switch to the R-G position. and then connect the PIX/GEN-LOCK connector to monochrome underscanned monitor.
- Aim the camera at the registration chart and set the lens iris to F4.

■ R deflection coil rotation adjustment

- Loosen the R coil lock screw (R LOCK) slightly and turn the R coil rotation screw (R ROTATION) slowly and carefully (Fig. 4-5-19) so that the R horizontal (black) lines of registration chart are parallel with the G horizontal (white) lines. (Fig. 4-5-20) The parallel can be confirmed by turning R V-CENTERING VR25.

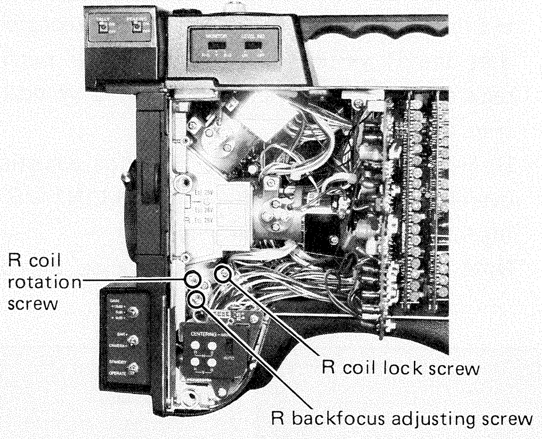
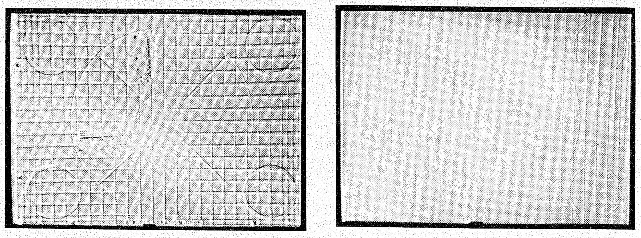


Fig. 4-5-19



NO GOOD GOOD

Fig. 4-5-20

- Confirm that the R backfocus remains properly adjusted. If not, readjust the R backfocus screw while referring to R focus adjustment.
- Tighten the R coil lock screw (R LOCK) after confirming the R deflection coil rotation and R backfocus.

■ **R skew adjustment**

- Adjust R SKEW VR16 so that the R vertical (black) lines of registration chart are parallel with the G vertical (white) lines. (Fig. 4-5-21) The parallel can be confirmed by turning R H-CENTERING VR24.

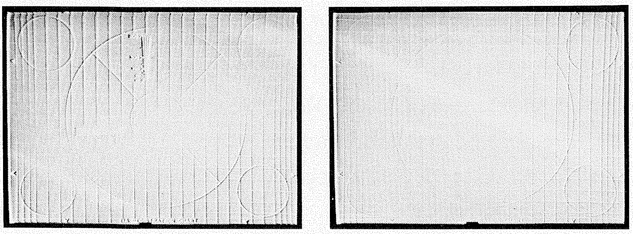

NO GOOD GOOD

Fig. 4-5-21

■ **R horizontal registration adjustment**

- Adjust R V-CENTERING VR25 so that the center horizontal lines of the registration chart for the R and G pictures coincide.
- Adjust R H-CENTERING VR24, R H-SIZE VL4, R H-LIN1 VR10 and R H-LIN2 VR11 repeatedly so that the R vertical lines in the center portion of registration chart coincide with the G vertical lines. (Fig. 4-5-22)

  R H-LIN2 VR11 is mainly used for adjusting the overall horizontal linearity and R H-LIN1 VR10 for the left side horizontal linearity.

  Note: When the R and G lines coincide, the contrast of line is minimum.

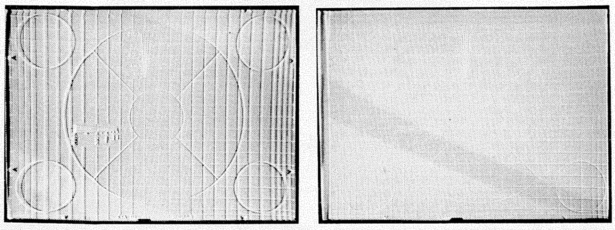

NO GOOD GOOD

Fig. 4-5-22

■ **R vertical registration adjustment**

- Adjust R V-CENTERING VR25, R V-SIZE VR20 and R V-LIN VR17 repeatedly so that the R horizontal lines of registration chart coincide with the G horizontal lines. (Fig. 4-5-23)

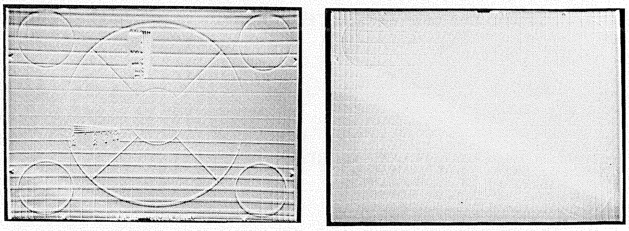

NO GOOD GOOD

Fig. 4-5-23

■ **R registration fine-adjustment**

- Check that the R and G lines of the registration chart coincide over the entire raster on the monochrome underscanned video monitor.

  If needed, fine-adjust R H-CENTERING VR24, R V-CENTERING VR25, R SKEW VR16, R H-SIZE VL4, R H-LIN1 VR10, R H-LIN2 VR11, R V-SIZE VR20 and R V-LIN VR17 carefully so that the R and G lines coincide.

(p) **Blue registration adjustment**

Adjusts :	B coil rotation screw	
	VL5 (B H-SIZE)	Deflection board
	VR12 (B H-LIN1)	Deflection board
	VR13 (B H-LIN2)	Deflection board
	VR21 (B V-SIZE)	Deflection board
	VR18 (B V-LIN)	Deflection board
	VR15 (B SKEW)	Deflection board
	VR26 (B H-CENTERING)	Deflection board
	VR27 (B V-CENTERING)	Deflection board
Observe :	Monochrome underscanned video monitor	

- Set the Monitor/PIX Select Switch to the B-G position and then the PIX/GEN-LOCK connector to monochrome underscanned monitor.
- Aim the camera at the registration chart and set the lens iris to F4.
- Adjust the blue registration as in the case of red registration adjustment.

o **B deflection coil rotation adjustment**

o Loosen the B coil lock screw (B LOCK) slightly and turn the B coil rotation screw (B ROTATION) slowly and carefully (Fig. 4-5-24) so that the B horizontal (black) lines of registration chart are parallel with the G horizontal (white) lines. (Fig. 4-5-20) The parallel can be confirmed by turning B V-CENTERING VR27.

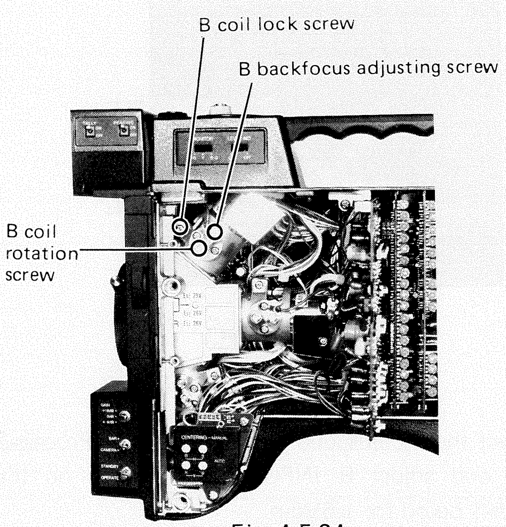


Fig. 4-5-24

- Confirm that the B backfocus remains properly adjusted. If not, readjust the B backfocus screw while referring to B focus adjustment.
- Tighten the B coil lock screw (B LOCK) after confirming the B deflection coil rotation and B backfocus.

- B skew adjustment
- Adjust B SKEW VR15 so that the B vertical (black) lines of registration chart are parallel with the G vertical (white) lines. (Fig. 4-5-21) The parallel can be confirmed by turning B H-CENTERING VR26.

- B horizontal registration adjustment
- Adjust B V-CENTERING VR27 so that the center horizontal lines of the registration chart for the B and G pictures coincide.
- Adjust B H-CENTERING VR26, B H-SIZE VL5, B H-LIN1 VR12 and B H-LIN2 VR13 repeatedly so that the B vertical lines in the center portion of registration chart coincide with the G vertical lines. (Fig. 4-5-22)

  B H-LIN2 VR13 is mainly used for adjusting the overall horizontal linearity and B H-LIN1 VR12 for the left side horizontal linearity.

  Note : When the B and G lines coincide, the contrast of line is minimum.

- B vertical registration adjustment
- Adjust B V-CENTERING VR26, B V-SIZE VR21 and B V-LIN VR18 repeatedly so that the B horizontal lines of registration chart coincide with the G horizontal lines.

- B registration fine-adjustment
- Check that the B and G lines of the registration chart coincide over the entire raster on the monochrome underscanned video monitor. If needed, fine-adjust B H-CENTERING VR27, B V-CENTERING VR26, B SKEW VR15, B H-SIZE L5, B H-LIN1 VR12, B H-LIN2 VR13, B V-SIZE VR21 and B V-LIN VR18 carefully so that the B and G lines coincide.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

4-6 Preamplifier Board Adjustment

(a) Frequency response adjustment

Test points :	TP1 (G)	Process-1 board
	TP2 (R)	Process-1 board
	TP3 (B)	Process-1 board
Adjusts :	CT1 (FREQUENCY RESPONSE)	Preamp board

- Aim the camera at the in-mega chart.
- Connect the oscilloscope to TP1(G) on the Process-1 board for the green signal.
- Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Expand the 0.5MHz - cycle portion on the oscilloscope. (Fig. 4-6-1)

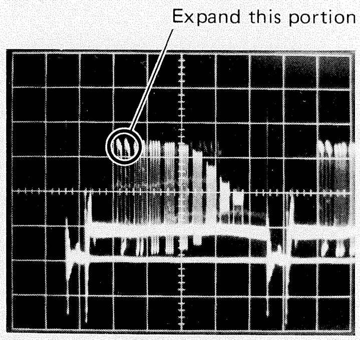


Fig. 4-6-1

- Adjust FREQUENCY RESPONSE CT1 on the Preamplifier board for the G channel (Fig. 4-6-2) to make the signal waveform as flat as possible. (Fig. 4-6-3)

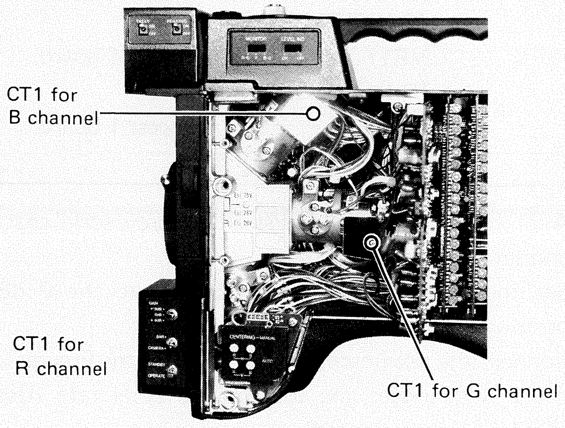
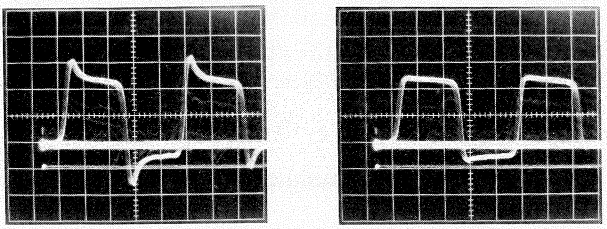


Fig. 4-6-2



NO GOOD GOOD

Fig. 4-6-3

- Connect the oscilloscope to TP2(R) on the Process-1 board for the red signal.
- Adjust FREQUENCY RESPONSE CT1 on the Preamplifier board for the R channel (Fig. 4-6-2) to make the signal waveform as flat as possible as in the case of G frequency response adjustment. (Fig. 4-6-3)
- Connect the oscilloscope to TP3(B) on the Process-1 board for the blue signal.
- Adjust FREQUENCY RESPONSE CT1 on the Preamplifier board for the B channel (Fig. 4-6-2) to make the signal waveform as flat as possible as in the case of G and R frequency response adjustment. (Fig. 4-6-3)

4-7 Process-1 Board Adjustment

- Refer to the separate booklet for the test points and adjusting points.
- Set the ABC, AWC ON/OFF switch on Process-1 board to OFF (MANUAL) position.
- Short Preset Round between RD1 and RD2 3-4 seconds on the Auto board for Preset the Auto board.

(a) Input GAIN adjustment

Test points :	TP4 (G)	Process-2 board
	TP5 (R)	Process-2 board
	TP6 (B)	Process-2 board
Adjusts :	VR6 (G INPUT GAIN)	Process-1 board
	VR11 (R INPUT GAIN)	Process-1 board
	VR1 (B INPUT GAIN)	Process-1 board

- Aim the camera at the logarithmic gray scale chart and set the lens iris to F4.
- Set the High Gain Selection Switch to the 0 dB position.
- Connect the oscilloscope to TP4(G) on the Process-2 board and trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Adjust G INPUT GAIN VR6 on the Process-1 board for 1.6Vp-p. (Fig. 4-7-1)

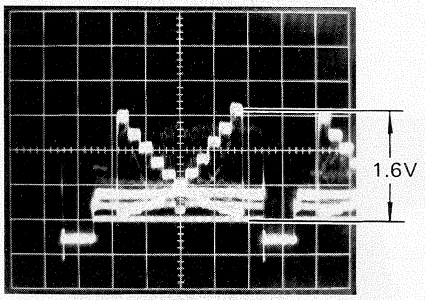


Fig. 4-7-1

- Connect the oscilloscope to TP5(R) on the Process-2 board and adjust R INPUT GAIN VR11 on the Process-1 board for 1.6Vp-p.
- Connect the oscilloscope to TP6(B) on the Process-2 board and adjust B INPUT GAIN VR1 on the Process-1 board for 1.6Vp-p.

(b) Dark shading adjustment

Test points :	TP4 (G)	Process-2 board
	TP5 (R)	Process-2 board
	TP6 (B)	Process-2 board
Adjusts :	VR7 (G V-SAWTOOTH)	Process-1 board
	VR8 (G V-PARABOLA)	Process-1 board
	VR9 (G H-SAWTOOTH)	Process-1 board
	VR10 (G H-PARABOLA)	Process-1 board
	VR12 (R V-SAWTOOTH)	Process-1 board
	VR13 (R V-PARABOLA)	Process-1 board
	VR14 (R H-SAWTOOTH)	Process-1 board
	VR15 (R H-PARABOLA)	Process-1 board
	VR2 (B V-SAWTOOTH)	Process-1 board
	VR3 (B V-PARABOLA)	Process-1 board
	VR4 (B H-SAWTOOTH)	Process-1 board
	VR5 (B H-PARABOLA)	Process-1 board

- Cap on the lens or set the filter wheel to the position 4.
- Set the High Gain Selection Switch to the +18 dB position.

■ G dark shading adjustment

- Connect the oscilloscope to TP4(G) on the Process-2 board and trigger the oscilloscope at H rate (use TP8(HD), Mother board).
- While observing the waveform adjust DARK SHADING, G H-SAWTOOTH VR9 and G H-PARABOLA VR10 on the Process-1 board to make the waveform as flat as possible. (Fig. 4-7-2)

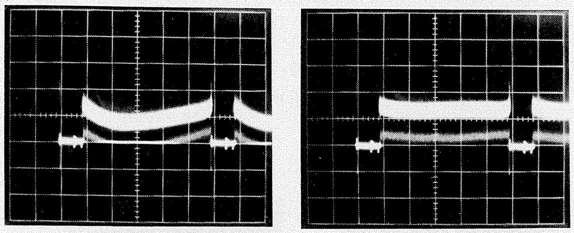

NO GOOD GOOD

Fig. 4-7-2

- After above adjustment, trigger the oscilloscope at V rate (Use TP7(VD), Mother board).
- Adjust G V-SAWTOOTH VR7 and G V-PARABOLA VR8 to make the waveform as flat as possible. (Fig. 4-7-3)

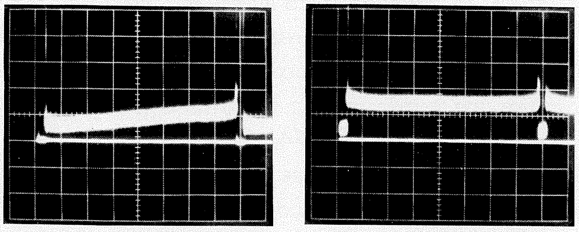

NO GOOD GOOD

Fig. 4-7-3

■ R dark shading adjustment

- Connect the oscilloscope to TP5(R) on the Process-2 board and trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Adjust DARK SHADING, R H-SAWTOOTH VR14 and R H-PARABOLA VR15 on the Deflection board to make the waveform as flat as possible as in the case of G dark shading adjustment. (Fig. 4-7-2)
- Trigger the oscilloscope at V rate (Use TP7(VD), Mother board).
- Adjust R V-SAWTOOTH VR12 and R V-PARABOLA VR13 to make the waveform as flat as possible. (Fig. 4-7-3)

■ B dark shading adjustment

- Connect the oscilloscope to TP6(B) on the Process-2 board and trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Adjust DARK SHADING, B H-SAWTOOTH VR4 and B H-PARABOLA VR5 on the Deflection board to make the waveform as flat as possible as in the case of G dark shading adjustment. (Fig. 4-7-2)
- Trigger the oscilloscope at V rate (Use TP7(VD), Mother board).
- Adjust B V-SAWTOOTH VR2 and B V-PARABOLA VR3 to make the dark waveform as flat as possible. (Fig. 4-7-3)

(c) Blanking offset adjustment

Test points :	TP4 (G)	Process-2 board
	TP5 (R)	Process-2 board
	TP6 (B)	Process-2 board
Adjusts :	VR17 (G BL OFFSET)	Process-1 board
	VR16 (R BL OFFSET)	Process-1 board
	VR18 (B BL OFFSET)	

- This adjustment should be done after completing the preceding step.
- Confirm that the Deflection board is fixed to the main chassis with two screws.
- Cap on the lens or set the filter wheel to the position 4.

■ G blanking offset adjustment

- Connect the oscilloscope to TP4(G) on the process-2 board and trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Set the High Gain Selection Switch on the side of camera to the 0 dB position and note the pedestal level at TP4.

- Set the High Gain Selection Switch to the +18 dB position and adjust G BL OFFSET VR17 on the Process-1 board so that the pedestal level at TP4 is same as the noted level. (Fig. 4-7-4)

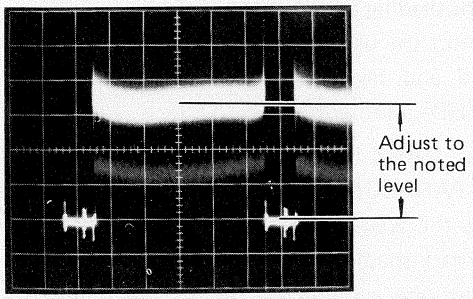


Fig. 4-7-4

- o Set the Selection Switch to the 0 dB position and note the pedestal level again.
- o Set the Selection Switch to the +12 dB position again and readjust VR17 so that the pedestal level is same as the noted level.
- o Repeat this procedure until the pedestal level stays same at the 0 dB and +12 dB position. (Fig. 4-7-5)

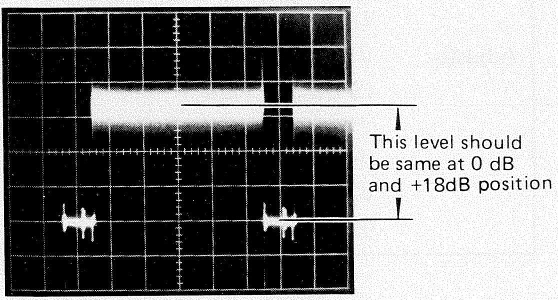


Fig. 4-7-5

- o R blanking offset adjustment
- o Adjust R BL OFFSET VR16 on the Process-1 board as in the case of G blanking offset adjustment so that the pedestal level at TP5 on the Process-2 board stays same at the 0 dB and +18 dB position of High Gain Selection Switch.

- o B blanking offset adjustment
- o Adjust B BL OFFSET VR18 on the Process-1 board as in the case of G blanking offset adjustment so that the pedestal level at TP6 on the Process-2 board stays same at the 0 dB and +18 dB position of High Gain Selection Switch.

4-8 Process-2 Board Adjustment

(a) G gamma, pedestal and gain adjustment

Test points :	TP1 (G)	Process-2 board
	TP4 (G)	Process-2 board
	VIDEO OUT	
Adjusts :	VR5 (G GAMMA)	Process-2 board
	VR6 (G GAIN)	Process-2 board
	VR4 (G PEDESTAL)	Process-2 board

- o Cap on the lens or set the filter wheel to the position 4.
- o Connect the oscilloscope to TP4(G).
- o Turn G PEDESTAL VR4 clockwise to observe the signal as shown in Fig. 4-8-1. Turn VR4 back until the pedestal level is 20mV from the blanking level. (Fig. 4-8-2)

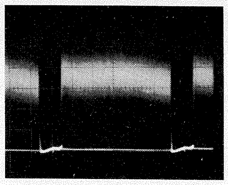


Fig. 4-8-1

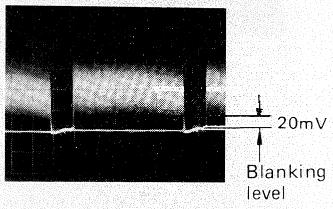


Fig. 4-8-2

Note : Confirm that the G pedestal level does not change by operating High Gain Selection Switch to 0dB and +18dB position.
If change, readjust the G BL OFFSET VR17 on Process-1 board.

- o Aim the camera at the logarithmic gray scale chart and set the lens iris to F4.
- o Connect the oscilloscope to TP1(G) on the Process-2 and trigger the oscilloscope at H rate (Use TP8 (HD), Mother board.).
- o Adjust G GAMMA VR5 so that the top step of gray scale waveform becomes 100% when the black step (lowest step) and the 5th step (crossing step) of gray scale waveform are positioned at 15% and 57% unit respectively by adjusting the vertical position and variable voltage (calibration) controls on the oscilloscope. (Fig. 4-8-3)

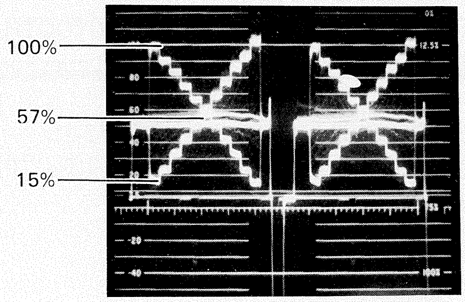


Fig. 4-8-3

- Set the lens iris to F4 and aim the camera at the gray scale.
- Connect the oscilloscope to terminated with 75 ohms VIDEO OUT connector.
- Adjust G GAIN VR6 so that the signal level between the blanking level and the top step of gray scale waveform is 0.7Vp-p. (Fig. 4-8-4)

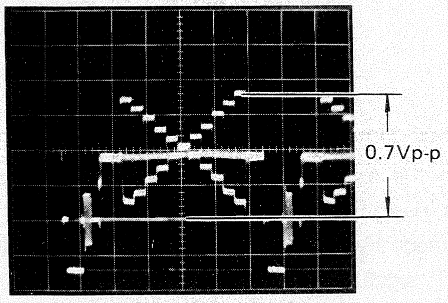


Fig. 4-8-4

(b) R gamma, pedestal and gain adjustment

Test points :	TP2 (R)	Process-2 board
	TP1 (G)	Process-2 board
Adjusts :	VR8 (R GAMMA)	Process-2 board
	VR9 (R GAIN)	Process-2 board
	VR7 (R PEDESTAL)	Process-2 board

- Aim the camera at the logarithmic gray scale chart and set the lens iris to F4.
- Connect the oscilloscope to TP1(G) and TP2(R).
- Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- Overlay the R signal and G signal on the oscilloscope and adjust R GAMMA VR8 so that the shape of R signal waveform proportionally coincides with the G signal waveform. (Fig. 4-8-5)

  Note : Do not pay attention to the signal level. It will be adjusted in the next step. Overlay the signals using· the variable voltage (calibration) control of oscilloscope.

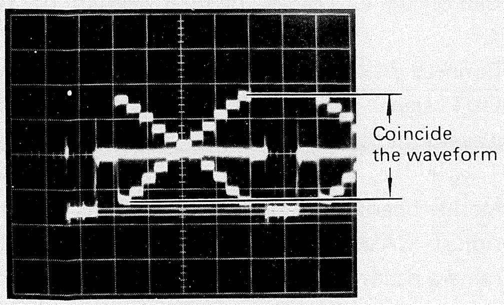
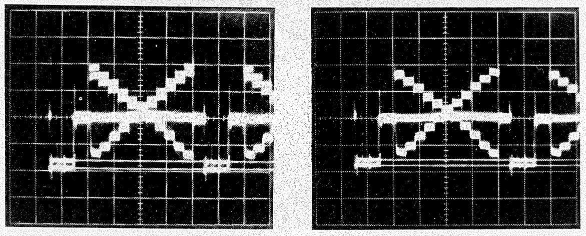


Fig. 4-8-5

- Reset the variable voltage control of oscilloscope to the calibrating position.
- Overlay the R signal and G signal and adjust R GAIN VR9 so that the signal level between the black chip (zero step) and white chip (top step) of the gray scale waveform match. (Fig. 4-8-6)



NO GOOD GOOD

Fig. 4-8-6

- Adjust the R PEDESTAL VR7 so that the black level between the blanking level and the black chip (zero step) of the gray scale waveform match. (Fig. 4-8-7)

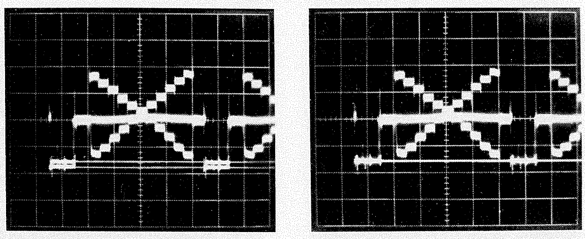


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Fig. 4-8-7

- Fine-adjust R GAMMA VR8, R GAIN VR9 and R PEDESTAL VR7 so that the R and G signal waveforms coincide each other.

(c) B gamma, pedestal and gain adjustment

Test points :	TP3 (B)	Process-2 board
	TP1 (G)	Process-2 board
Adjusts :	VR2 (B GAMMA)	Process-2 board
	VR3 (B GAIN)	Process-2 board
	VR1 (B PEDESTAL)	Process-2 board

- Aim the camera at the logarithmic gray scale chart and set the lens iris to F2.8.
- Connect the oscilloscope to TP1(G) and TP3(B).
- Trigger the oscilloscope at H rate (Use TP8, Mother board).
- Overlay the B signal and G signal on the oscilloscope and adjust B GAMMA VR2 so that the shape of B signal waveform proportionally coincides with the G signal waveform. (Fig. 4-8-8)

Note : Do not pay attention to the signal level. It will be adjusted in the next step. Overlay the signals using the variable voltage (calibration) control of oscilloscope.

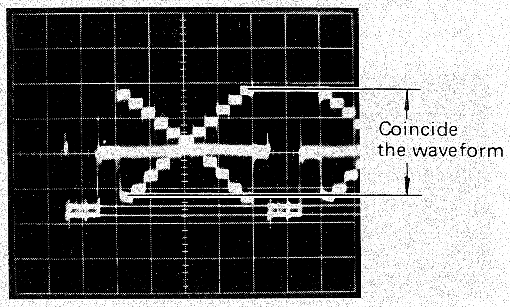
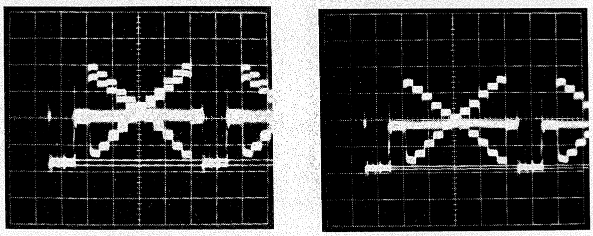


Fig. 4-8-8

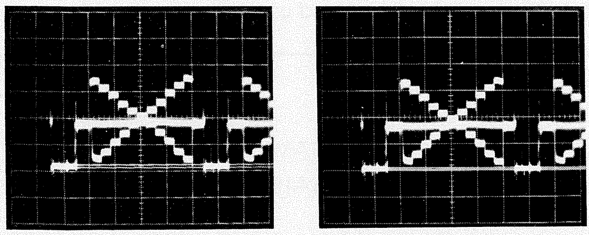
- o Reset the variable voltage control of oscilloscope to the calibrating position.
- o Overlay the B signal and G signal and adjust B GAIN VR3 so that the signal level between the black chip (zero step) and white chip (top step) of the gray scale waveform match. (Fig. 4-8-9)



NO GOOD GOOD

Fig. 4-8-9

- o Adjust the B PEDESTAL VR1 so that the black level between the blanking level and the black chip (zero step) of the gray scale waveform match. (Fig. 4-8-10)



NO GOOD GOOD

Fig. 4-8-10

- o Fine-adjust B GAMMA VR2, B GAIN VR3 and B PEDESTAL VR1 so that the B and G signal waveforms coincide each other.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(d) White balance fine adjustment

Test point :	VIDEO OUT	
Adjusts :	VR8 (R GAMMA)	Process-2 board
	VR9 (R GAIN)	Process-2 board
	VR7 (R PEDESTAL)	Process-2 board
	VR2 (B GAMMA)	Process-2 board
	VR3 (B GAIN)	Process-2 board
	VR1 (B PEDESTAL)	Process-2 board

- o Aim the camera at the gray scale chart and set the lens iris to F4.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT to the waveform monitor.
- o Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- o Fine-adjust R GAMMA VR8, R GAIN VR9, R PEDESTAL VR7, B GAMMA VR2, B GAIN VR3 and B PEDESTAL VR1 so that the carrier on the PAL signal is minimum. (Fig. 4-8-11)

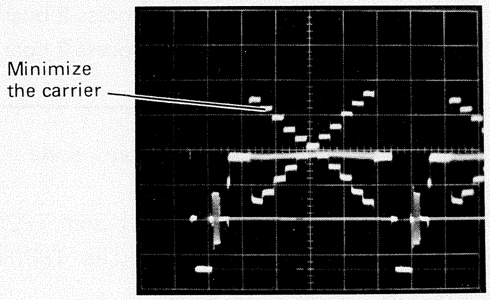


Fig. 4-8-11

(e) Camera pedestal adjustment

Test point :	VIDEO OUT	
Adjust :	VR12 (CAMERA PEDESTAL)	Encoder board

- o Cap on the lens or set the filter wheel to the position 4.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT to the waveform monitor.
- o Trigger the oscilloscope at H rate. (Use TP8(HD), Mother board.)
- o Adjust CAMERA PEDESTAL VR12 so that the camera pedestal level is 35 mV. (Fig. 4-8-12)

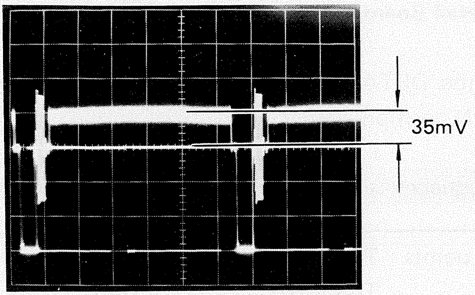


Fig. 4-8-12

- o Aim the camera at the gray scale chart and set the lens iris to F2.8.
- o Readjust G GAIN VR6, R GAIN VR9 and B GAIN VR3 on Process-2 board so that the Y signal level between blanking level and white chip at VIDEO OUT is 0.7Vp-p.

(f) White clip adjustment

Test point :	VIDEO OUT	
Adjusts :	VR11 (G WHITE CLIP)	Process-2 board
	VR13 (R WHITE CLIP)	Process-2 board
	VR12 (B WHITE CLIP)	Process-2 board

- o Aim the camera at the gray scale chart and set the lens iris to F4.
- o Set the High Gain Selection Switch to the +18dB position.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT to the waveform monitor.
- o Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- o Adjust G WHITE CLIP VR11 so that the signal level between black step and top step of the G signal is clipped at 0.78Vp-p. (Fig. 4-8-13)

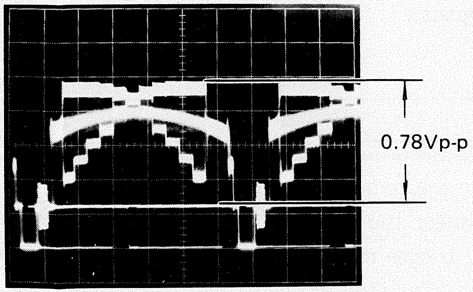


Fig. 4-8-13

- o Adjust R WHITE CLIP VR13 and B WHITE CLIP VR12 so that the carrier on the clip portion of the gray scale waveform is minimum. (Fig. 4-8-14)

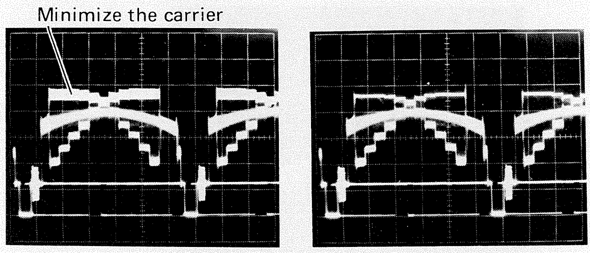


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Fig. 4-8-14

- o Reset the High Gain Select Switch to the 0dB position.

(g) Feedback beam control adjustment

Test points :	VIDEO OUT	
	TP1 (G)	Process-1 board
	TP2 (R)	Process-1 board
	TP3 (B)	Process-1 board
Adjusts :	VR8 (G FBC LEVEL)	High voltage board
	VR7 (R FBC LEVEL)	High voltage board
	VR9 (B FBC LEVEL)	High voltage board

- o Pan the camera so that the white chip of gray scale positions at the center of the monitor screen.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT connector to the waveform monitor.
- o Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).
- o Adjust the lens iris so that the PAL output level is 0.7Vp-p. (Fig. 4-8-15)

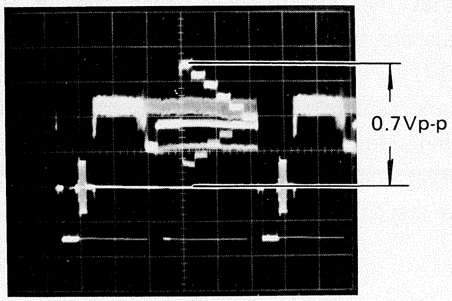


Fig. 4-8-15

- o Connect the oscilloscope to TP1(G) on the Process-1 board.
- o Note the peak-to-peak signal level. (Fig. 4-8-16)

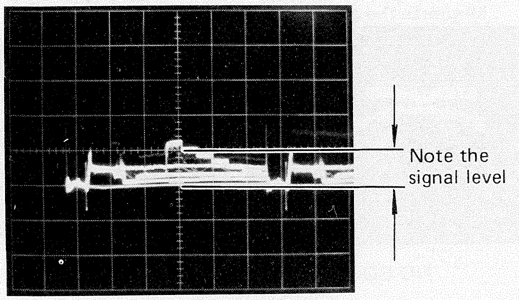


Fig. 4-8-16

- o Set the lens iris fully opened.
- o Adjust G FBC LEVEL VR8 on the High voltage board so that the peak-to-peak signal level is four (4) times of the noted level. (Fig. 4-8-17)

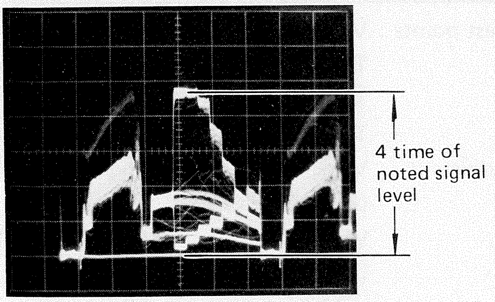


Fig. 4-8-17

- o Adjust the feedback beam control for red and blue signals as in the case of the green signal.
- o Adjust the lens iris so that the PAL output level is 0.7Vp-p. (Fig. 4-8-15)
- o Connect the oscilloscope to TP2 (R) and TP3 (B) on the Process-1 board.
- o Note the peak-to-peak signal level of R and B signal. (Fig. 4-8-16)
- o Set the lens iris fully opened.
- o Adjust R FBC LEVEL VR7 and B FBC LEVEL VR9 so that the peak-to-peak signal level of R and B signals are four (4) times of the noted level. (Fig. 4-8-17)
- o Pan the camera right and left and confirm that the trailing side of white chip of gray scale chart has no color at the lens iris fully opened. If not, readjust above steps.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

4-9 Detail Board Adjustment

- o Set the DETAIL ON/OFF SWITCH on Detail board to ON position.

(a) Frequency response adjustment

Test points :	TP1 (1H)	Detail board
	TP3 (0H)	Detail board
Adjust :	CT1 (FREQ. RESPONSE)	Detail board

- o Aim the camera at the in-mega chart and set the lens iris to F4.0.
- o Connect the oscilloscope to TP1 (1H) and TP3 (0H) on Detail board.
- o Trigger the oscilloscope at H rate. (Use TP17 (HD), Mother board.)
- o Overlay the 1H-delayed signal and non-delayed signal on the oscilloscope.
- o Adjust FREQ. RESPONSE CT1 on the Detail board so that the frequency response at TP1 and TP3 is equal. (The envelope of in-mega signal at TP1 and TP3 becomes equal.) (Fig. 4-9-1)

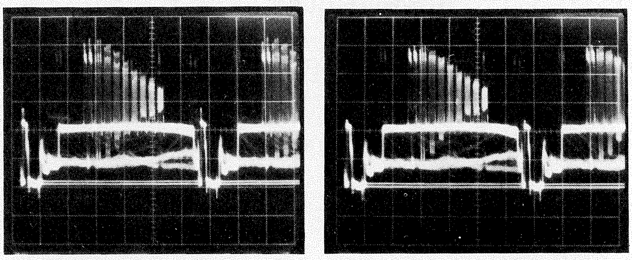

NO GOOD GOOD

Fig. 4-9-1

(b) V detail balance and V detail gain adjustment

Test points :	TP4 (G)	Process-2 board
	TP4 (V.DETAIL)	Detail board
Adjusts :	VR2 (V.BALANCE)	Detail board
	VR3 (V.GAIN)	Detail board

- o Aim the camera at the window chart.
- o Connect the oscilloscope to TP4 on Process-2 board and trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Adjust the lens iris so that the G signal at TP4 on Process-2 board becomes 1.6Vp-p.

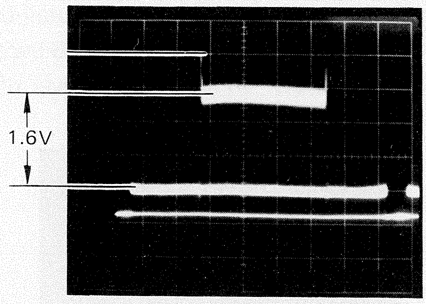


Fig. 4-9-2

- o Connect the oscilloscope to TP4 (V.DETAIL) on the Detail board.
- o Adjust the V DETAIL BALANCE VR2 to cancel the video signal and V edge signal is obtained.
- o Trigger the oscilloscope at V rate. (Use TP7 (VD), Mother board.)
- o Adjust V DETAIL GAIN VR3 so that the left side of the V edge signal becomes 200mVp-p.

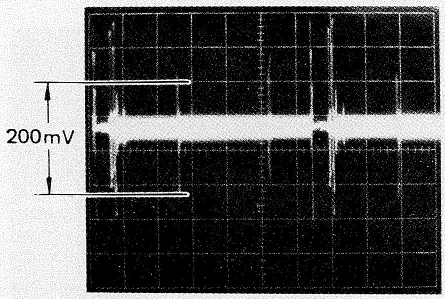


Fig. 4-9-3

(c) H detail balance and H detail gain adjustment

Test points :	TP6 (H.DETAIL)	Detail board
	TP4 (G)	Process-2 board
Adjusts :	VR4 (H.GAIN)	Detail board
	VR5 (H.BALANCE)	Detail board

- o Aim the camera at the window chart so that the chart fully occupies the raster.
- o Connect the oscilloscope to TP4 on Process-2 board and trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Adjust the lens iris so that the G signal at TP4 on Process-2 board becomes 1.6Vp-p.
- o Connect the oscilloscope to TP6 (H.DETAIL) on the Detail board and trigger the oscilloscope at H rate.
- o Adjust H BALANCE VR5 to cancel the video signal.
- o Adjust H GAIN VR4 so that the H detail (edge) signal at TP6 becomes 100mVp-p.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

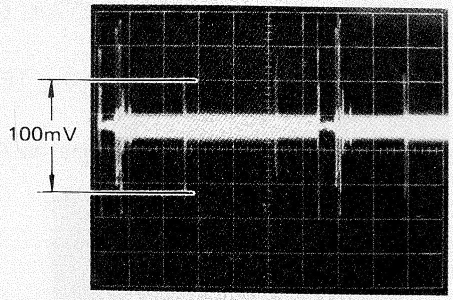


Fig. 4-9-4

(d) Level dependent and noise suppress adjustment

Test points :	VIDEO OUT	
	TP7 (DETAIL OUT)	Detail board
Adjusts :	VR6 (LEVEL DEPENDENT)	Detail board
	VR7 (NOISE SUPPRESS)	Detail board

- o Turn LEVEL DEPENDENT VR6 and NOISE SUPPRESS VR7 fully clockwise.
- o Aim the camera at the logarithmic gray scale chart.
- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Adjust the lens iris so that the black chip of the gray scale signal at VIDEO OUT becomes 86 mV. from the blanking level.

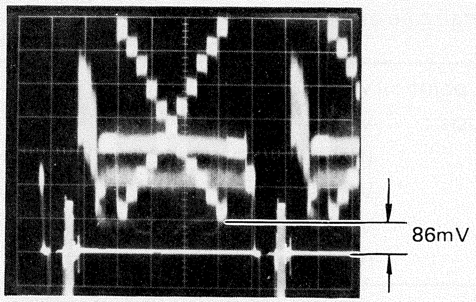


Fig. 4-9-5

- o Adjust LEVEL DEPENDENT VR6 so that the noise on the black chip (zero step) of the gray scale waveform starts being suppressed.

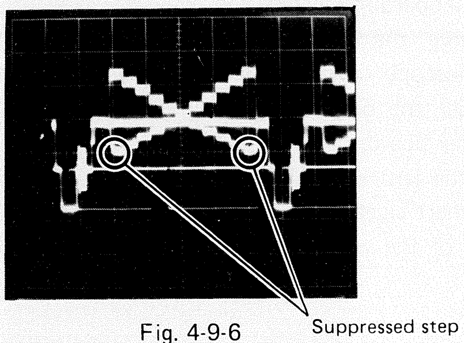


Fig. 4-9-6

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- o Connect the oscilloscope to TP7 (DETAIL OUT) on the Detail board.
- o Trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Note the noise level of the detail signal as A.

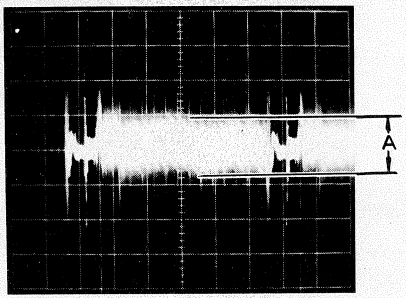


Fig. 4-9-7

- o Adjust the NOISE SUPPRESS VR7 on the Detail board so that the noise level becomes 1/2 A.

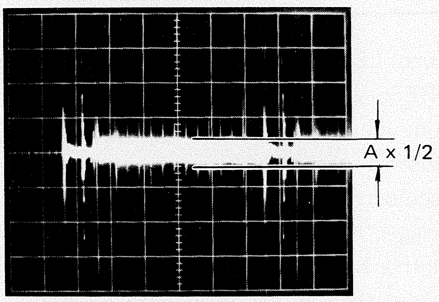


Fig. 4-9-8

(e) Detail gain adjustment

Test point :	VIDEO OUT	
Adjusts :	VR8 (DETAIL GAIN)	Detail board
	VR4 (H GAIN)	Detail board
	VR6 (LEVEL DEPENDENT)	Detail board

- o Aim the camera at the window chart so that the chart fully occupies the raster.
- o Set the Monitor/PIX Select Switch on to the Y position and set the DETAIL ON/OFF Switch on the Detail board to ON position.
- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Trigger the oscilloscope at V rate. (Use TP7 (VD), Mother board.)
- o Set the lens iris so that the white level of the white set chart signal becomes 571 mVp-p from the black level of the window chart signal and note this level as A.
- o Adjust the DETAIL GAIN VR8 on the Detail board so that the vertical detail (aperture) signal B becomes B/A x 100 = 125 ± 5% from the black level of the window chart signal.

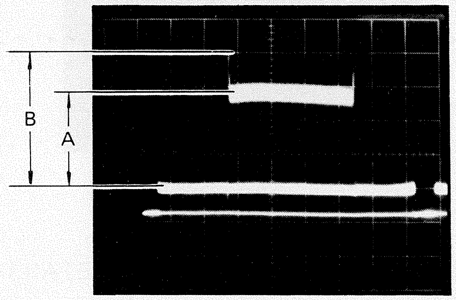


Fig. 4-9-9

- o Trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- o Confirm that the horizontal detail (aperture) signal B and C is (B+C)/2A x 100 = 115 ± 5%. If not, readjust the H GAIN VR4 on the Detail board.

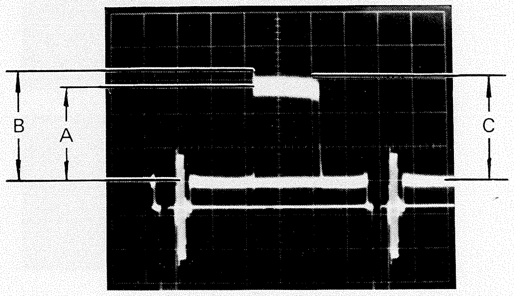


Fig. 4-9-10

- o Set the lens iris so that the white level of the white set chart signal becomes 178 mVp-p from the black level of the window chart signal and note this level as A.
- o Trigger the oscilloscope at V rate. (Use TP7 (VD), Mother board.)
- o Confirm that the vertical detail (aperture) signal B is B/A x 100 = 115% or higher. If not, readjust LEVEL DEPENDENT VR6 on the Detail board.

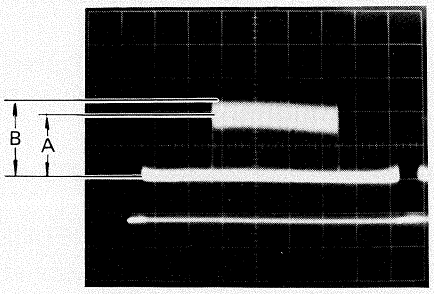


Fig. 4-9-11

(f) Pulse mix adjustment

Test point :	TP4 (G)	Process-2 board
Adjust :	VR1 (PULSE MIX)	Detail board

- Cap on the lens or set the filter wheel to the position 4.
- Connect the oscilloscope to TP4 (G) on the Process-2 board and trigger the oscilloscope at H rate. (Use TP8 (HD), Mother board.)
- Adjust the G PEDESTAL VR4 on Process-2 board so that the G pedestal level becomes approximately 0.2V from the blanking level.
- Set the DETAIL ON/OFF Switch SW1 on the Detail board to OFF position and note the pedestal level at TP4.
- Set the DETAIL ON/OFF Switch SW1 to ON position and adjust PULSE MIX VR1 on the Detail board so that the pedestal level at TP4 is the same as the noted level. (Fig. 4-9-12)

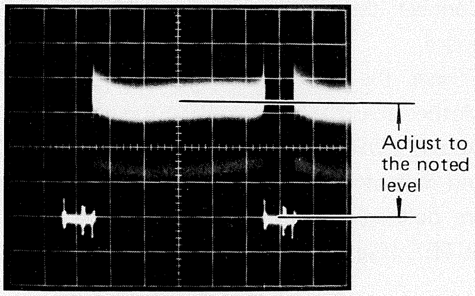


Fig. 4-9-12

- Set the DETAIL ON/OFF Switch SW1 to OFF position and note the pedestal level again.
- Set the DETAIL ON/OFF Switch SW1 to ON position and adjust VR1 so that the pedestal level is the same as the noted level.
- Repeat this procedure until the pedestal level stays the same by operating the DETAIL ON/OFF Switch SW1 ON and OFF.

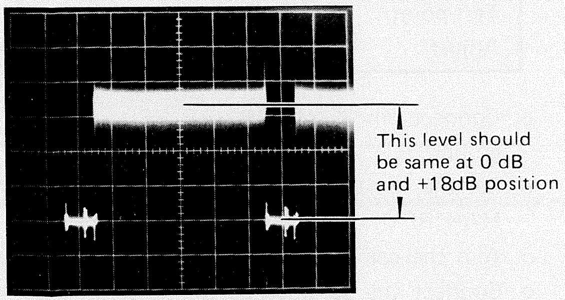


Fig. 4-9-13

- Set the DETAIL ON/OFF Switch SW1 to ON position.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

4-10 Auto Board Adjustment

- Set the ABC/AWC ON/OFF switch on Process-1 board to AUTO position.
- Set the AUTO MANUAL SELECT SWITCH to AUTO position.
- Short RD1 and RD2 for a few seconds to initialize the microprocessor.

(a) Gate pulse adjustment

Test points :	TP1 (G.P)	Auto board
	TP7 (V.D)	Mother board
	TP8 (H.D)	Mother board
Adjusts :	VR1 (H.GATE PULSE-1)	Auto board
	VR2 (H.GATE PULSE-2)	Auto board
	VR3 (V.GATE PULSE-1)	Auto board
	VR4 (V.GATE PULSE-2)	Auto board

- Connect the oscilloscope to TP1 (G.P) on the Auto board and TP8 H.D signal on the Mother board.
- Trigger the oscilloscope at H.rate. (Use TP8 (H.D) on the Mother board.)
- Adjust the H.GATE PULSE-1 VR1 so that the H.gate pulse at TP1 lags by 25μsec the H.D pulse at TP8 on Mother board and adjust H.GATE PULSE-2 VR2 so that the H.gate pulse width is 25μsec. (Fig. 4-10-1)

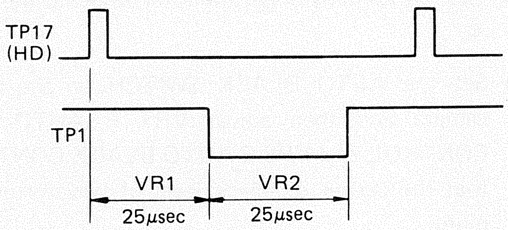


Fig. 4-10-1

- Connect the oscilloscope to TP1 (G.P) on the Auto board and TP7 V.D signal on the Mother board.
- Trigger the oscilloscope at V.rate. (Use TP7 (V.D) on the Mother board.)
- Adjust the V.GATE PULSE-1 VR3 so that the V.gate pulse at TP1 lags by 6msec the VD pulse at TP7 on Mother board and adjust V.GATE PULSE-2 VR2 so that the V.gate pulse width is 6msec. (Fig.4-10-2)

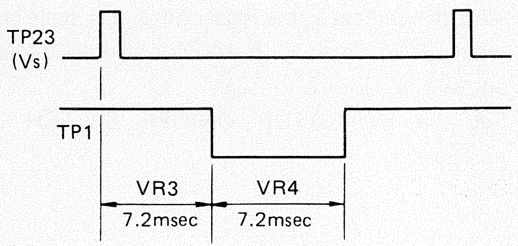


Fig. 4-10-2

(b) Auto white control and Auto black control adjustment

Test point :	VIDEO OUT	
Adjust :	VR5 (R AUTO WHITE CONTROL)	Auto board
	VR6 (B AUTO WHITE CONTROL)	Auto board
	VR7 (R AUTO BLACK CONTROL)	Auto board
	VR8 (B AUTO BLACK CONTROL)	Auto board

- ○ Aim the camera at the logarithmic gray scale chart and set the lens iris to F2.8.
- ● Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT connector to the waveform monitor.
- ● Trigger the oscilloscope at H rate. (Use TP8(HD), Mother board.)
- ● Set the VR5 R AUTO WHITE CONTROL, VR6 B AUTO WHITE CONTROL, VR7 R AUTO BLACK CONTROL and VR8 B AUTO BLACK CONTROL to center position.
- ● Set the AUTO WHITE SWITCH on the front of camera and then adjust VR5 R AUTO WHITE CONTROL and VR6 B AUTO WHITE CONTROL so that the carrier on white chip (top step) of the gray scale waveform is minimum.
- ● Cap on the lens or set the filter wheel to the position 4.
- ● Set the AUTO BLACK SWITCH on the front of camera and then adjust VR7 R AUTO BLACK CONTROL and VR8 B AUTO BLACK CONTROL so that the carrier on black level of waveform is minimum.
- ● Repeat adjusting until the carrier on white chip and black chip of waveform are minimum.

(c) Level indicator adjustment

Adjusts :	VR14 (INDICATOR DC LEVEL)	Process-2 board
	VR15 (INDICATOR LEVEL)	Process-2 board

- ● Aim the camera at the logarithmic gray scale chart on which illuminated with 140 footcandles (1400 lux) and set the lens iris to F2.8.
- ● Set the INDICATOR ON/OFF SWITCH is ON position.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- ● Adjust the INDICATOR LEVEL VR15 so that the white chip (top step) of the gray scale turns into dark on the viewfinder first and then adjust the INDICATOR DC LEVEL VR14 so that the intensity of the white chip portion becomes same as the fifth step (crossing step).
- ● Adjust the INDICATOR LEVEL VR15 to the point where the white chip just before begins to dark.

4-11 Automatic Iris Control Adjustment

(a) AIC corner gate level adjustment

Test point :	TP7	Process-2 board
Adjust :	VR10 (CORNER GATE LEVEL)	Process-2 board

- ● Aim the camera at the logarithmic gray scale chart so that the chart occupies the monitor screen.
- ● Connect the oscilloscope to TP7 on the Process-2 board.
- ● Trigger the oscilloscope at H rate (Use TP8(HD), Mother board.).
- ● Adjust CORNER GATE LEVEL VR10 so that one and half of the gray scale chip width from both sides are deleted and the rest part (center part) appears at TP7. (Fig. 4-11-1)

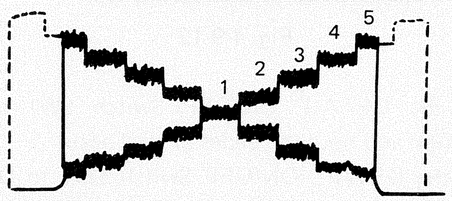


Fig. 4-11-1

(b) AIC level adjustment

Test point :	VIDEO OUT	
Adjust :	VR12 (IRIS SET)	High voltage board

- ○ Connect pin 32 of 32P VTR/RCU connector to the ground.
- ○ Set the Iris Control Selection Switch (IRIS AUTO/MAN/REM) on the lens to the REM position.
- ○ Aim the camera at the logarithmic gray scale chart.
- ○ Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT connector to the waveform monitor.
- ○ Trigger the oscilloscope at H rate (Use TP8(HD), Mother board).

- Adjust IRIS SET VR12 on the High Voltage, AIC board so that the PAL signal level is 0.7Vp-p. (Fig. 4-11-1)

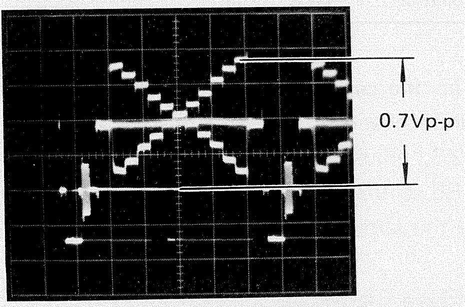


Fig. 4-11-1

(c) Lens AIC level adjustment

Test point : VIDEO OUT
Adjust : VR6 In the Lens
(VIDEO LEVEL PRESET)

- Set the Lens Control Selection Switch on the lens to AUTO position.
- Connect the oscilloscope to the terminated VIDEO OUT signal or connect the VIDEO OUT connector to the waveform monitor.
- Trigger the oscilloscope at H rate. (Use TP8(HD), Mother board.)
- Adjust VIDEO LEVEL PRESET VR6 in the lens so that the PAL signal level is 0.7Vp-p. (Fig. 4-11-2)

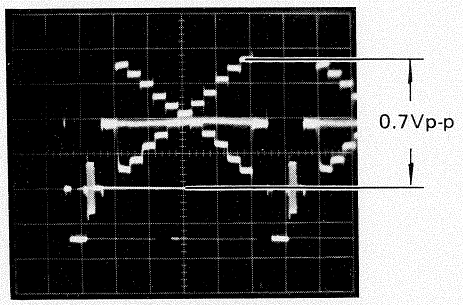


Fig. 4-11-2

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

4-12 1.5 Viewfinder WV-VF32B Adjustment

- Disassemble the 1.5 viewfinder.
- Set the monitor/PIX select switch to Y position.
- Refer to the separate booklet for the test points and adjusting controls.

(a) +1.8V adjustment

Test points : TP1 (+1.8V)
TP5 (GND)
Adjust : VR3 (+1.8V ADJ)

- Connect the digital voltmeter probe between TP1 (+1.8V) and TP5 (GND).
- Adjust +1.8V ADJ VR3 for +1.8V±0.05V.

(b) Horizontal hold adjustment

Test points : TP3 (H HOLD)
TP5 (GND)
Adjust : VR2 (H HOLD)

- Connect the digital voltmeter probe between TP3 (H HOLD) and TP5 (GND).
- Adjust H HOLD VR2 for +2.6V and confirm that the picture is held horizontally.

(c) Centering magnets adjustment

Adjusts : L4 (H SIZE)
VR1 (V SIZE)
Centering magnets
Observe : Viewfinder

- Reduce picture size using H SIZE L4 and V SIZE VR1 so that the entire raster is observed on the viewfinder.
- Aim the camera at the registration chart.
- Adjust the centering magnets (See Fig. 4-12-2) so that the raster comes to the center of viewfinder screen. (Fig. 4-12-1)

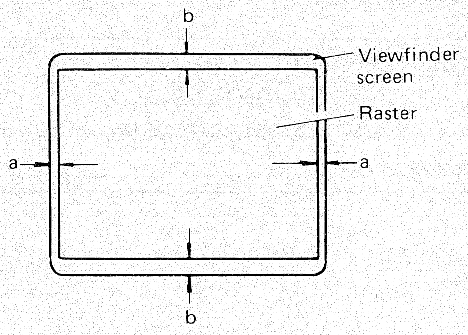


Fig. 4-12-1

(d) Picture tilt adjustment

Adjust : Deflection coil
Observe : Viewfinder

- Loosen the deflection coil holding screw. (Fig. 4-12-2)

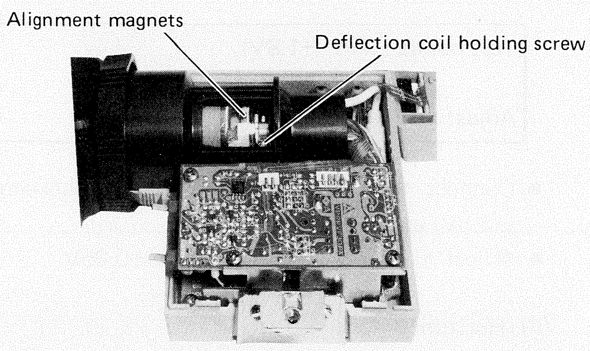


Fig. 4-12-2

- Observe the viewfinder and turn the deflection coil so that the raster is straight.
- Tighten the deflection coil holding screw.

(e) Horizontal and vertical size adjustment

Adjusts : L4 (H SIZE)
VR1 (V SIZE)
Observe : Viewfinder

- Aim the camera at the registration chart.
- Adjust H SIZE L4 and stop just before horizontal edges of raster touching to the both edges of viewfinder screen.
- Adjust V SIZE VR1 so that the circle in the chart is as rearly a true circle as possible.
- Confirm that the four corners of raster are observed on the viewfinder. If not, readjust the centering magnets.

(f) Subbrightness adjustment

Adjusts : VR4 (CONTRAST)
VR5 (BRIGHTNESS)
VR7 (SUBBRIGHTNESS)
Observe : Viewfinder

- Close the lens or set the filter wheel to the position 4.
- Set the CONTRAST VR4 fully clockwise and BRIGHTNESS VR5 fully counterclockwise.
- Adjust the SUBBRIGHTNESS VR7 the raster at the point where becomes the brightest but the retrace line is not appear.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(g) Contrast and brightness adjustment

Adjusts : VR4 (CONTRAST)
VR5 (BRIGHTNESS)
Observe : Viewfinder

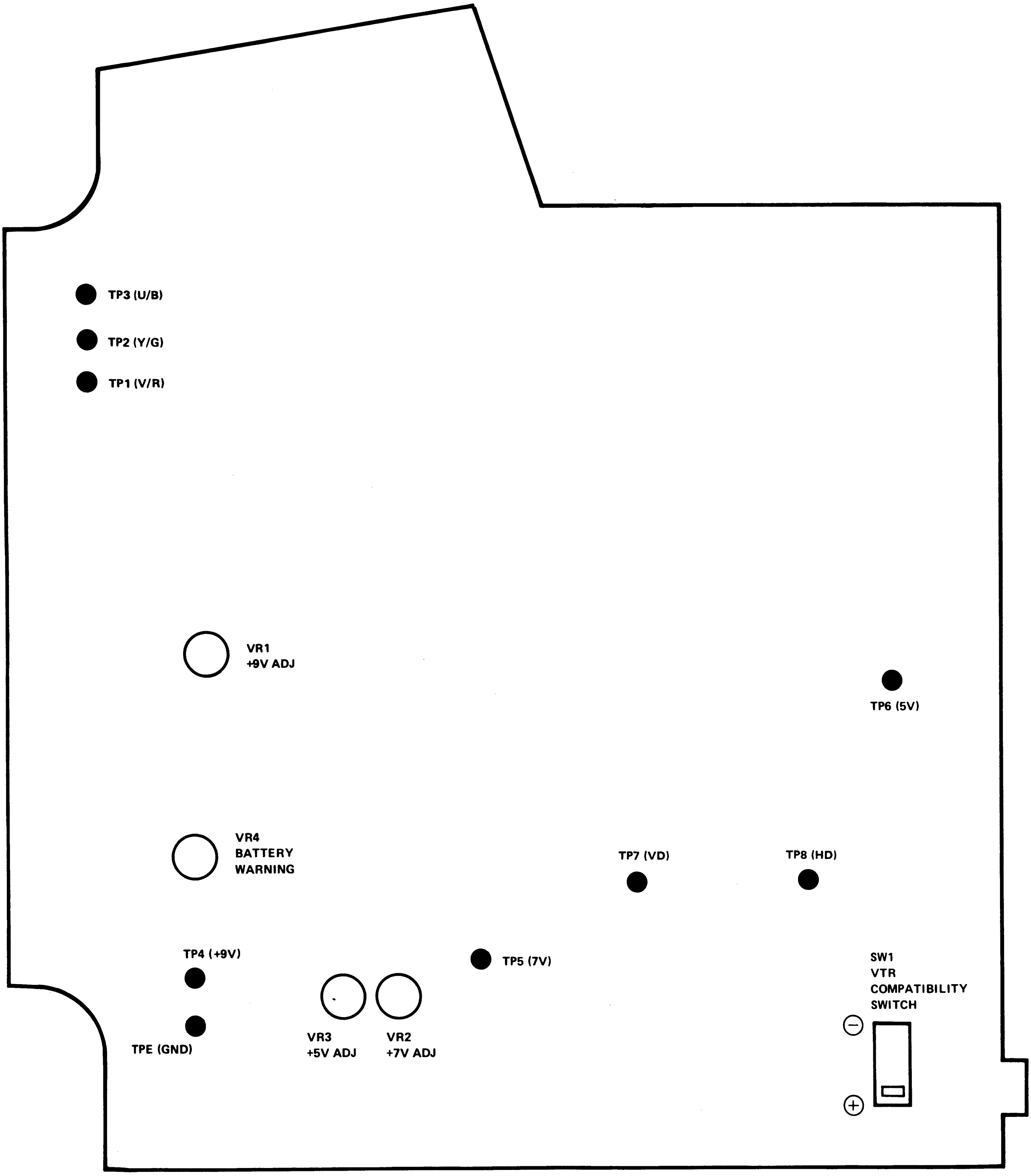
- Aim the camera at the logarithmic gray scale chart.
- While changing the iris from the closed position to F2.8, adjust CONTRAST VR4 and BRIGHTNESS VR5 so that the black-and-white chip gradations will be the same on the viewfinder as that in the monitor.

(h) Focus adjustment

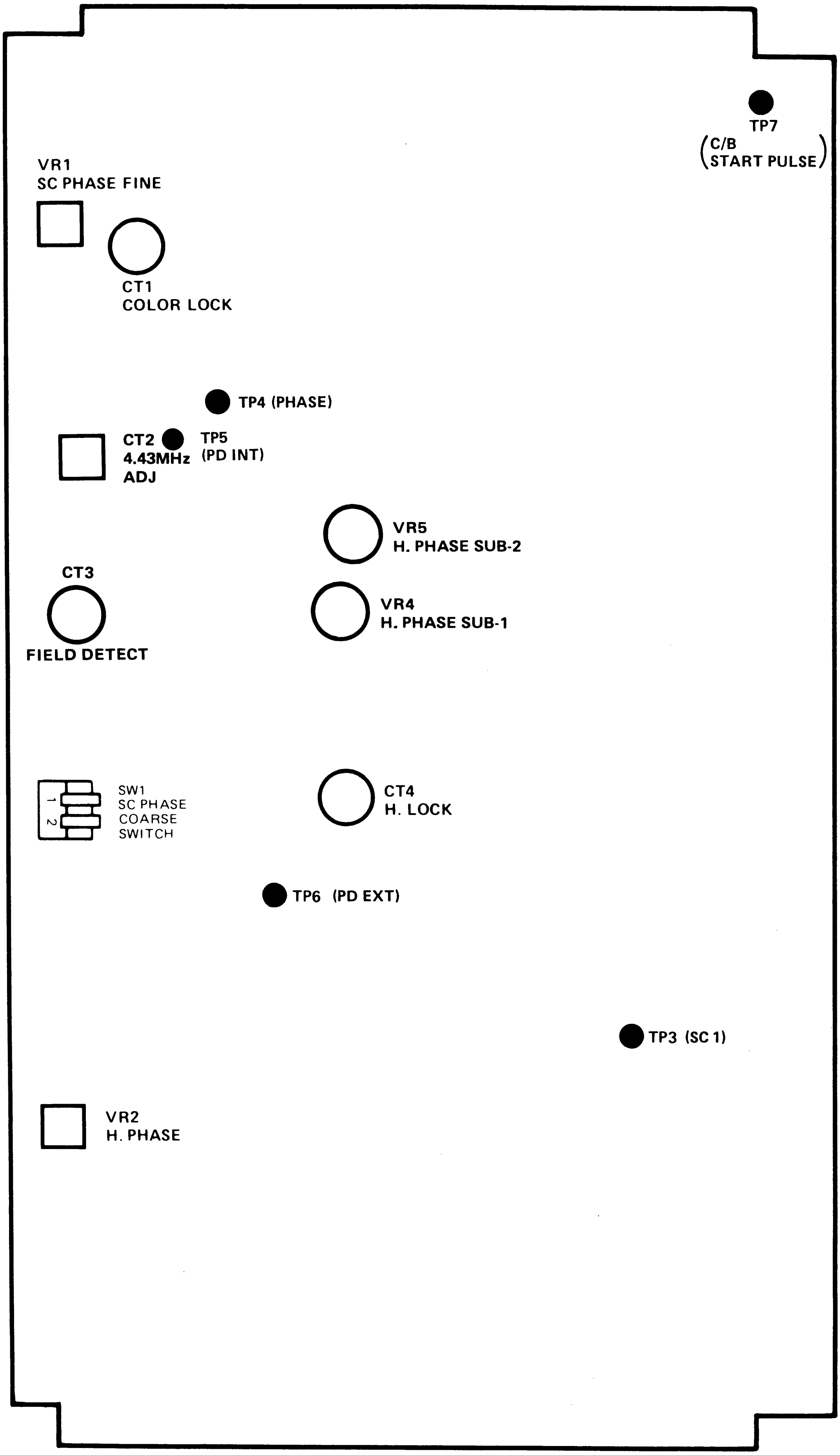
Adjust : VR6 (FOCUS)
Observe : Viewfinder

- Aim the camera at the resolution chart.
- Adjust FOCUS VR6 for best resolution in the viewfinder.

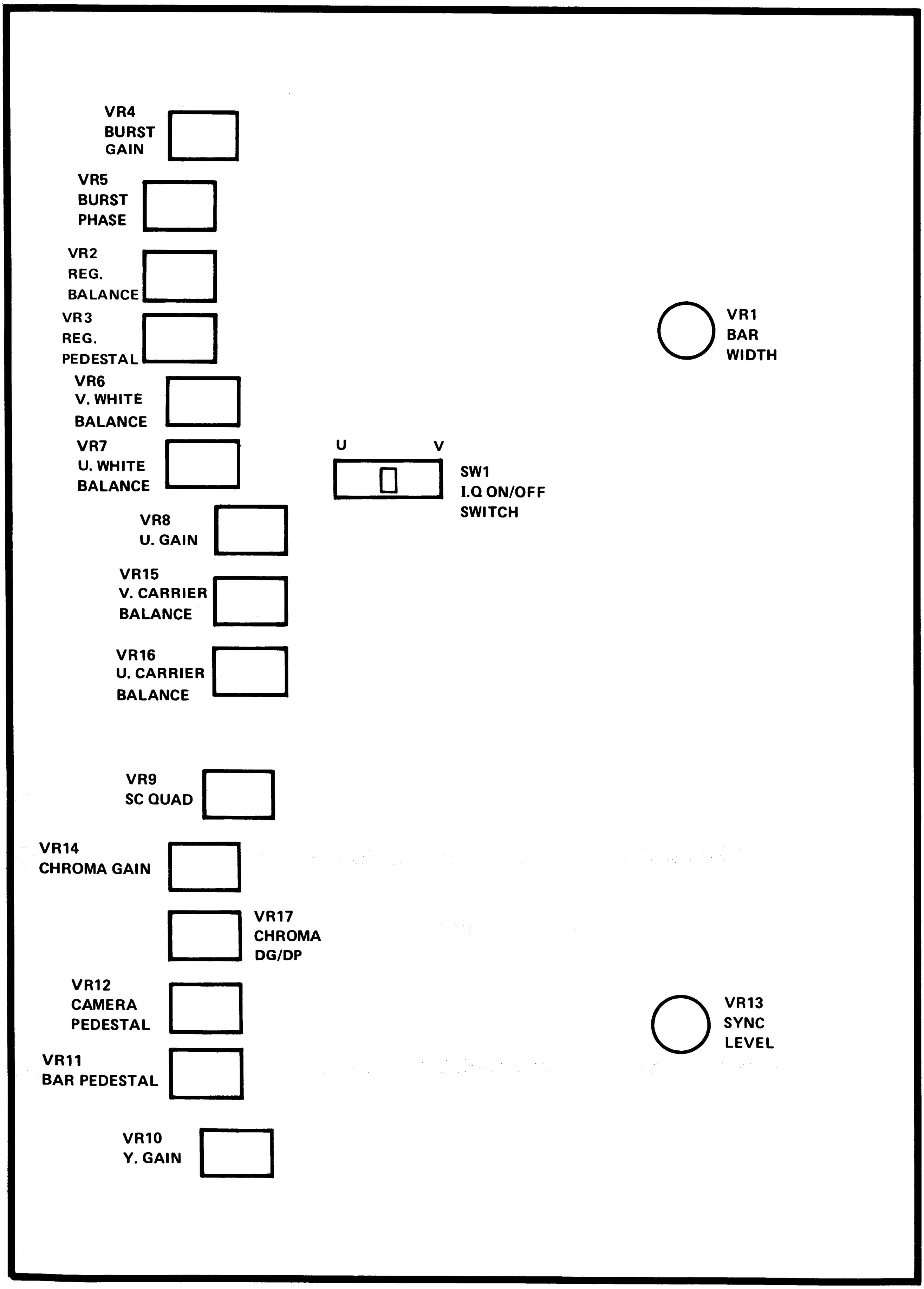
MOTHER BOARD — Conductor Side —


TP3 (U/B)
TP2 (Y/G)
TP1 (V/R)
VR1
+9V ADJ
TP6 (5V)
VR4
BATTERY
WARNING
TP7 (VD)
TP8 (HD)
TP4 (+9V)
TP5 (7V)
SW1
VTR
COMPATIBILITY
SWITCH
TPE (GND)
VR3
+5V ADJ
VR2
+7V ADJ
⊖
⊕

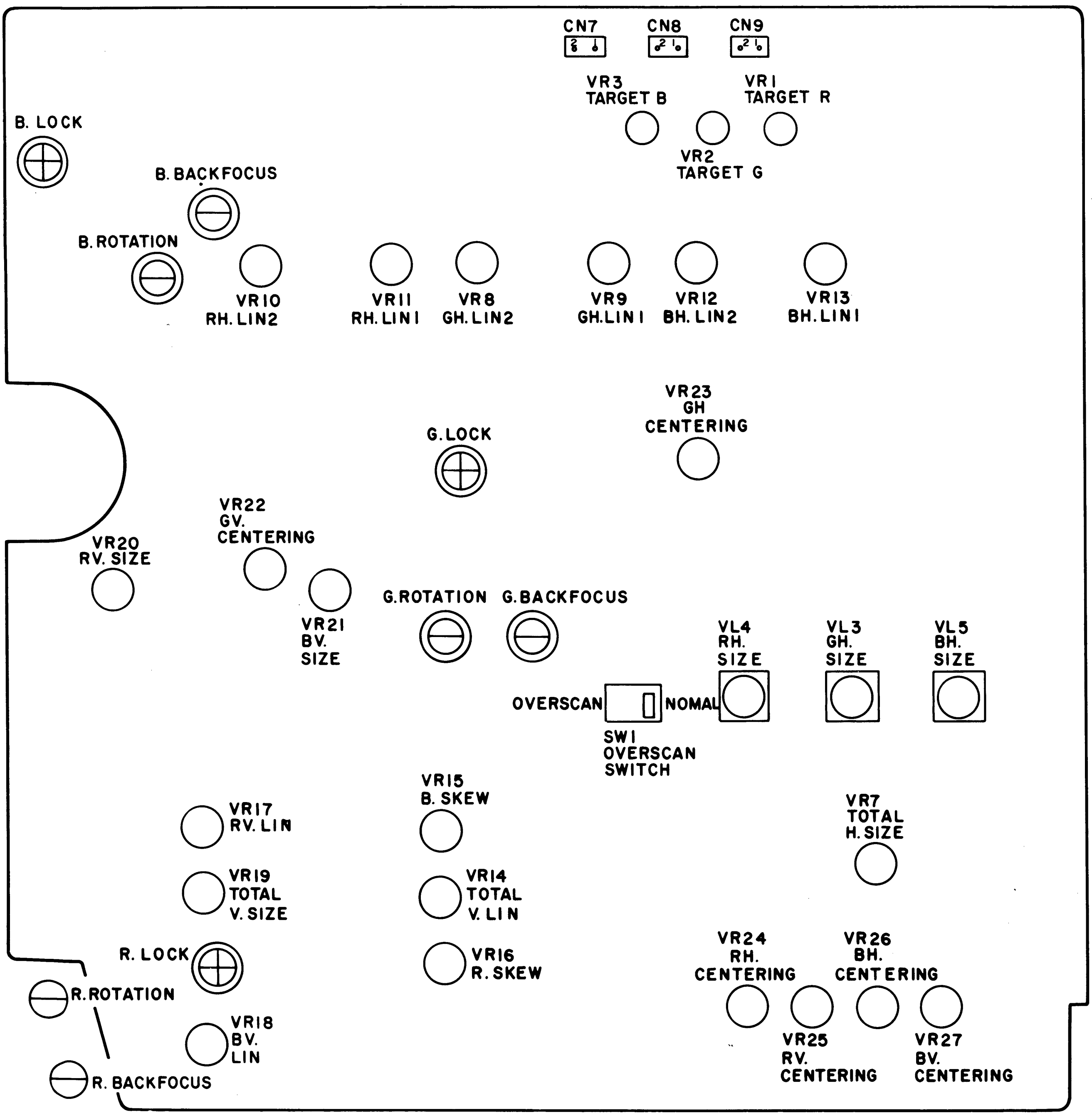
SYNC BOARD — Component Side —


TP7
(C/B START PULSE)
VR1
SC PHASE FINE
CT1
COLOR LOCK
TP4 (PHASE)
CT2
4.43MHz
ADJ
TP5
(PD INT)
VR5
H. PHASE SUB-2
CT3
FIELD DETECT
VR4
H. PHASE SUB-1
SW1
SC PHASE
COARSE
SWITCH
1
2
CT4
H. LOCK
TP6 (PD EXT)
TP3 (SC 1)
VR2
H. PHASE

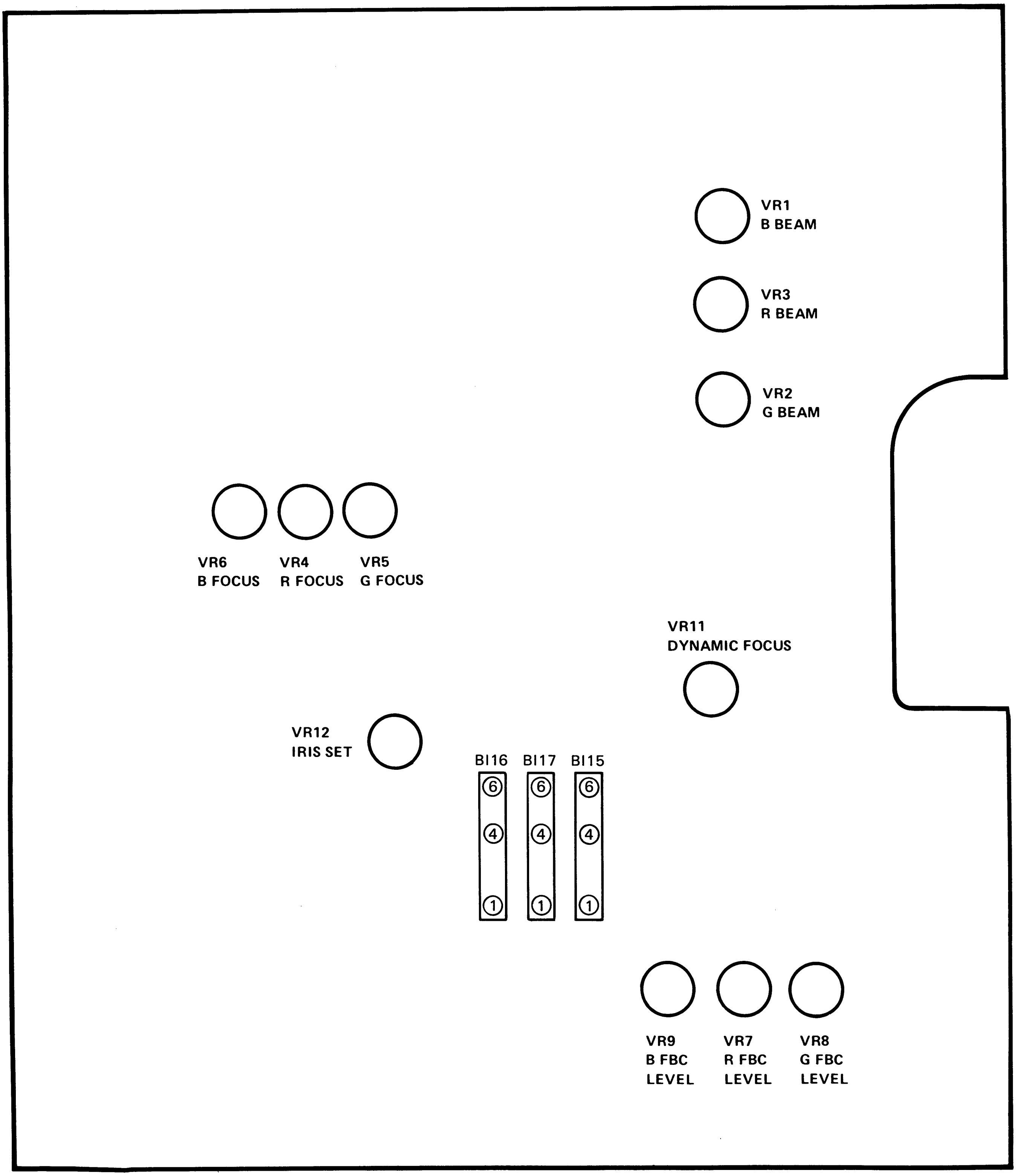
ENCODER BOARD — Component Side —


VR4
BURST
GAIN
VR5
BURST
PHASE
VR2
REG.
BALANCE
VR3
REG.
PEDESTAL
VR6
V. WHITE
BALANCE
VR7
U. WHITE
BALANCE
VR8
U. GAIN
VR15
V. CARRIER
BALANCE
VR16
U. CARRIER
BALANCE
VR9
SC QUAD
VR14
CHROMA GAIN
VR17
CHROMA
DG/DP
VR12
CAMERA
PEDESTAL
VR11
BAR PEDESTAL
VR10
Y. GAIN
U
V
SW1
I.Q ON/OFF
SWITCH
VR1
BAR
WIDTH
VR13
SYNC
LEVEL

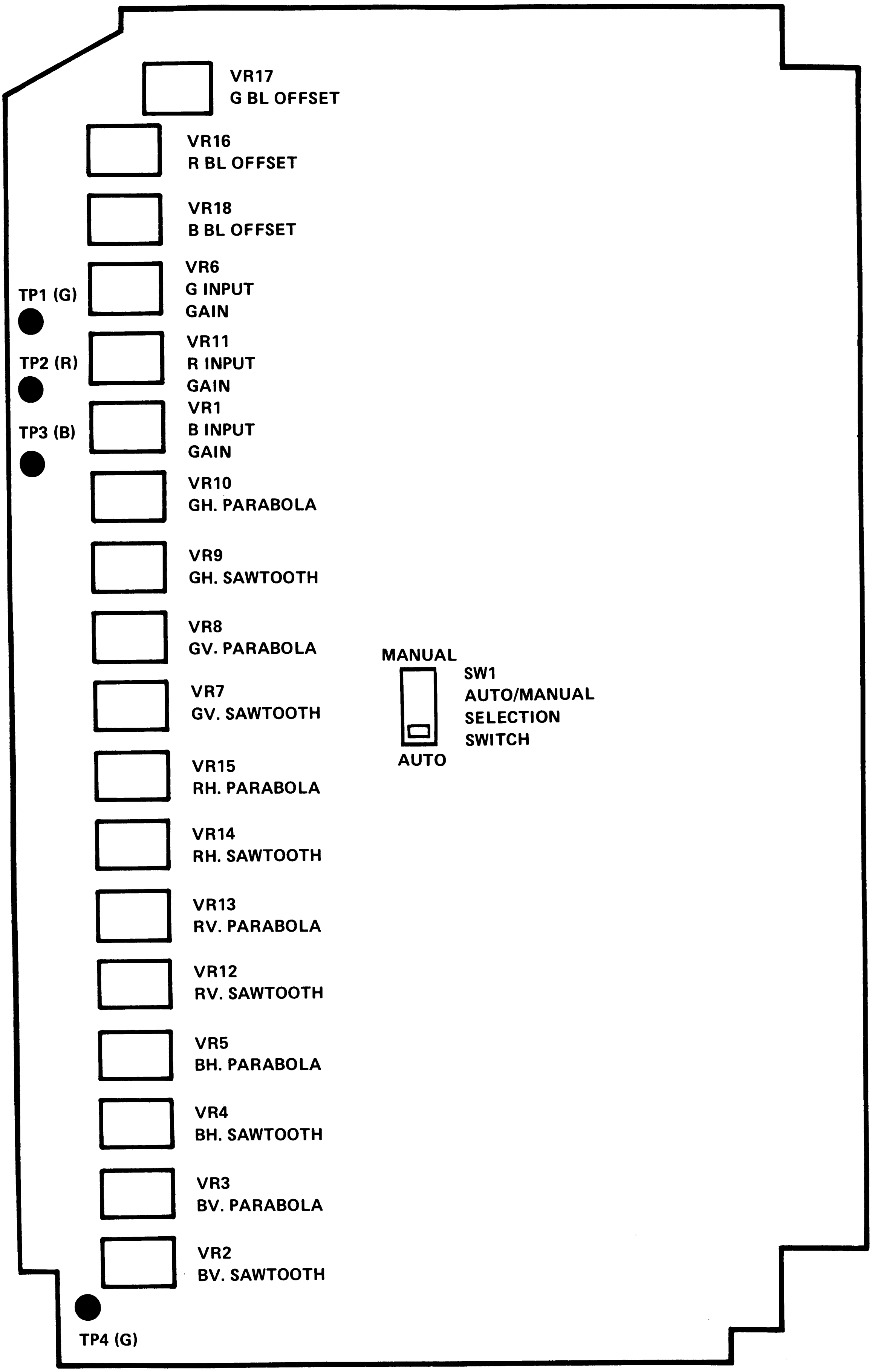
DEFLECTION BOARD – Conductor Side –


CN7
CN8
CN9
VR3
TARGET B
VR1
TARGET R
VR2
TARGET G
B. LOCK
B. BACKFOCUS
B. ROTATION
VR10
RH. LIN2
VR11
RH. LIN1
VR8
GH. LIN2
VR9
GH. LIN1
VR12
BH. LIN2
VR13
BH. LIN1
VR23
GH
CENTERING
G. LOCK
VR22
GV.
CENTERING
VR20
RV. SIZE
VR21
BV.
SIZE
G. ROTATION
G. BACKFOCUS
VL4
RH.
SIZE
VL3
GH.
SIZE
VL5
BH.
SIZE
OVERSCAN
NOMAL
SW1
OVERSCAN
SWITCH
VR15
B. SKEW
VR17
RV. LIN
VR7
TOTAL
H. SIZE
VR19
TOTAL
V. SIZE
VR14
TOTAL
V. LIN
R. LOCK
VR16
R. SKEW
VR24
RH.
CENTERING
VR26
BH.
CENTERING
R. ROTATION
VR18
BV.
LIN
VR25
RV.
CENTERING
VR27
BV.
CENTERING
R. BACKFOCUS

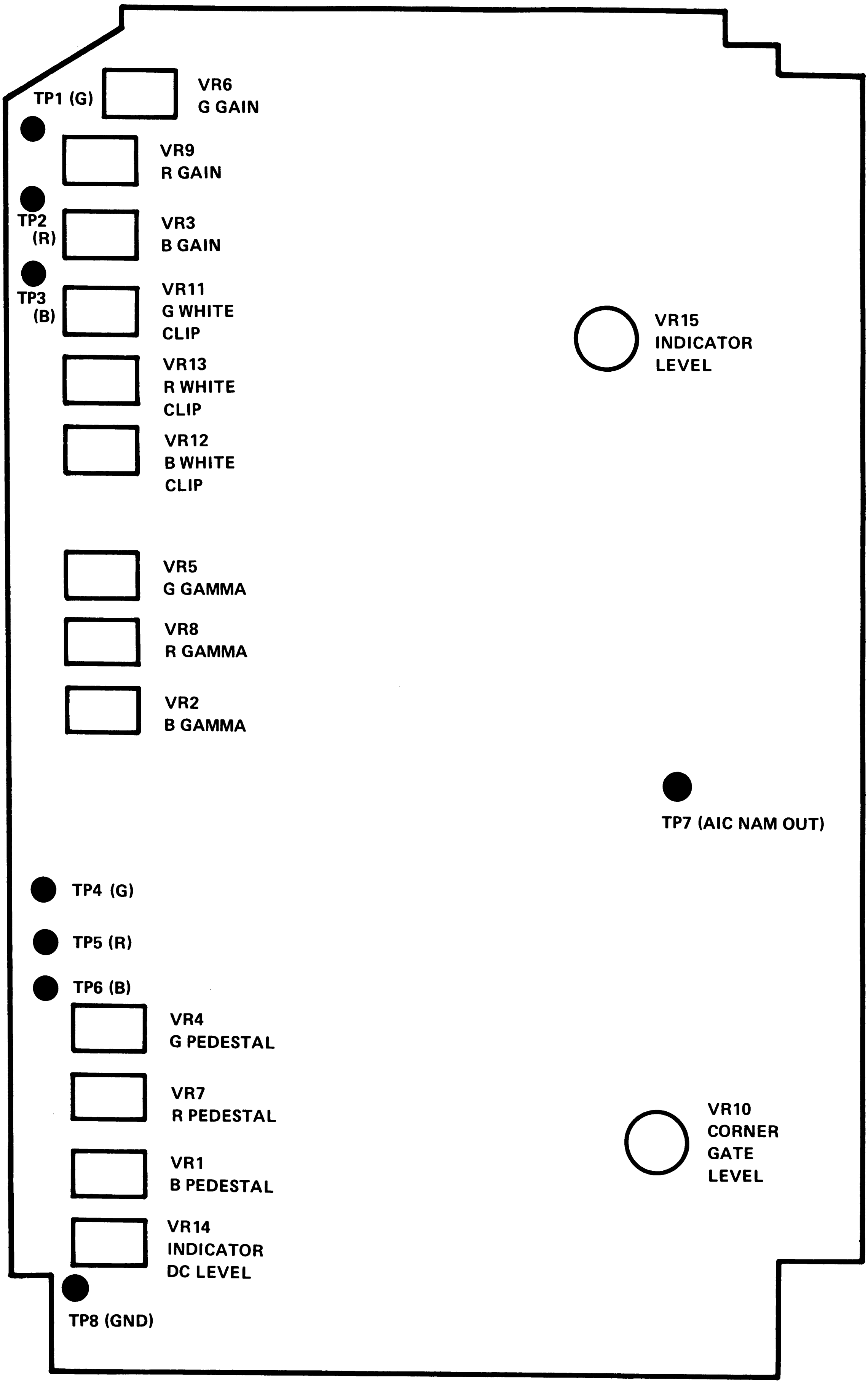
HIGH VOLTAGE AIC BOARD — Conductor Side —


VR1
B BEAM
VR3
R BEAM
VR2
G BEAM
VR6
B FOCUS
VR4
R FOCUS
VR5
G FOCUS
VR11
DYNAMIC FOCUS
VR12
IRIS SET
BI16
BI17
BI15
⑥
④
①
⑥
④
①
⑥
④
①
VR9
B FBC
LEVEL
VR7
R FBC
LEVEL
VR8
G FBC
LEVEL

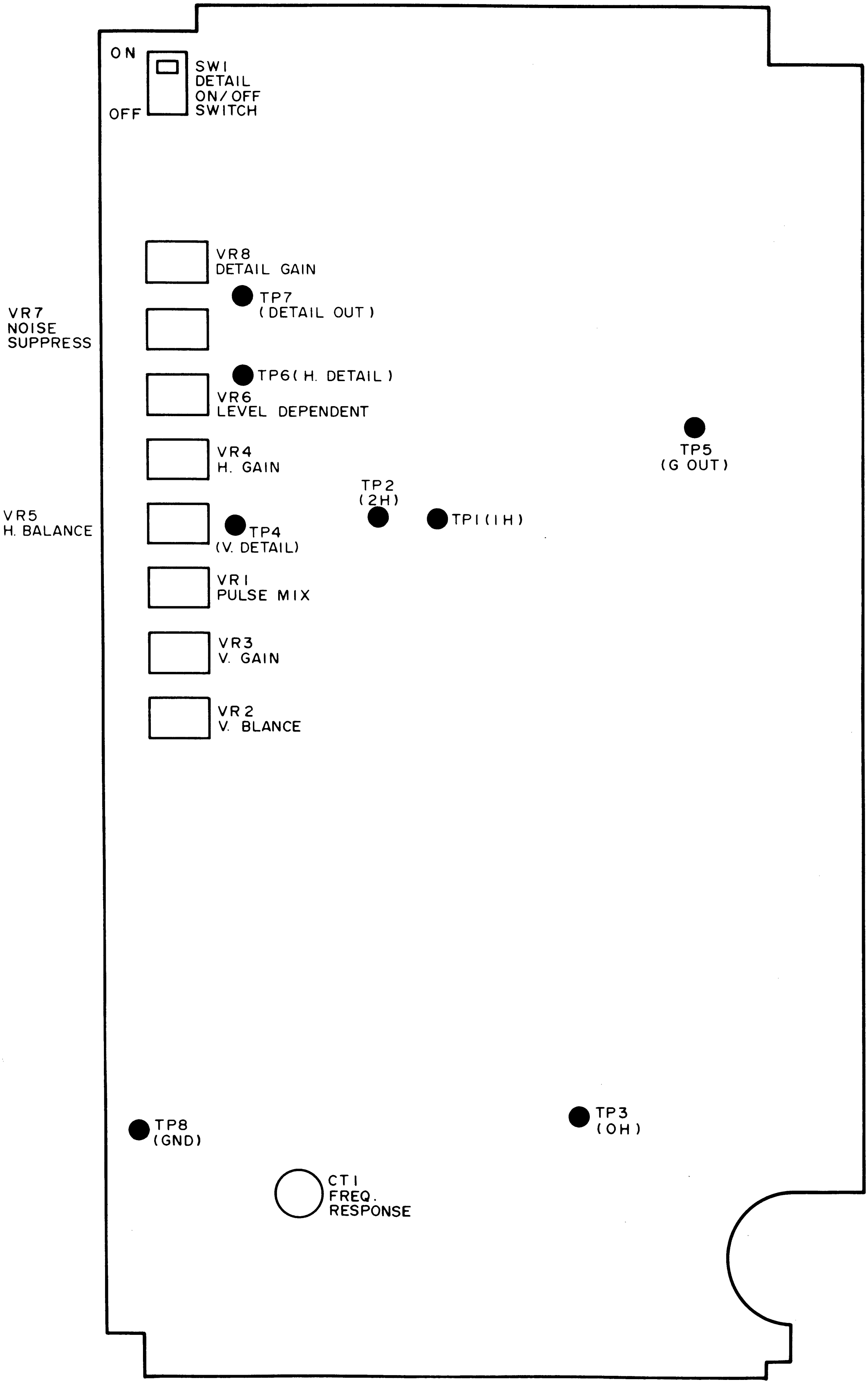
PROCESS-1 BOARD — Component Side —


VR17
G BL OFFSET
VR16
R BL OFFSET
VR18
B BL OFFSET
VR6
G INPUT
GAIN
TP1 (G)
VR11
R INPUT
GAIN
TP2 (R)
VR1
B INPUT
GAIN
TP3 (B)
VR10
GH. PARABOLA
VR9
GH. SAWTOOTH
VR8
GV. PARABOLA
MANUAL
SW1
AUTO/MANUAL
SELECTION
SWITCH
AUTO
VR7
GV. SAWTOOTH
VR15
RH. PARABOLA
VR14
RH. SAWTOOTH
VR13
RV. PARABOLA
VR12
RV. SAWTOOTH
VR5
BH. PARABOLA
VR4
BH. SAWTOOTH
VR3
BV. PARABOLA
VR2
BV. SAWTOOTH
TP4 (G)

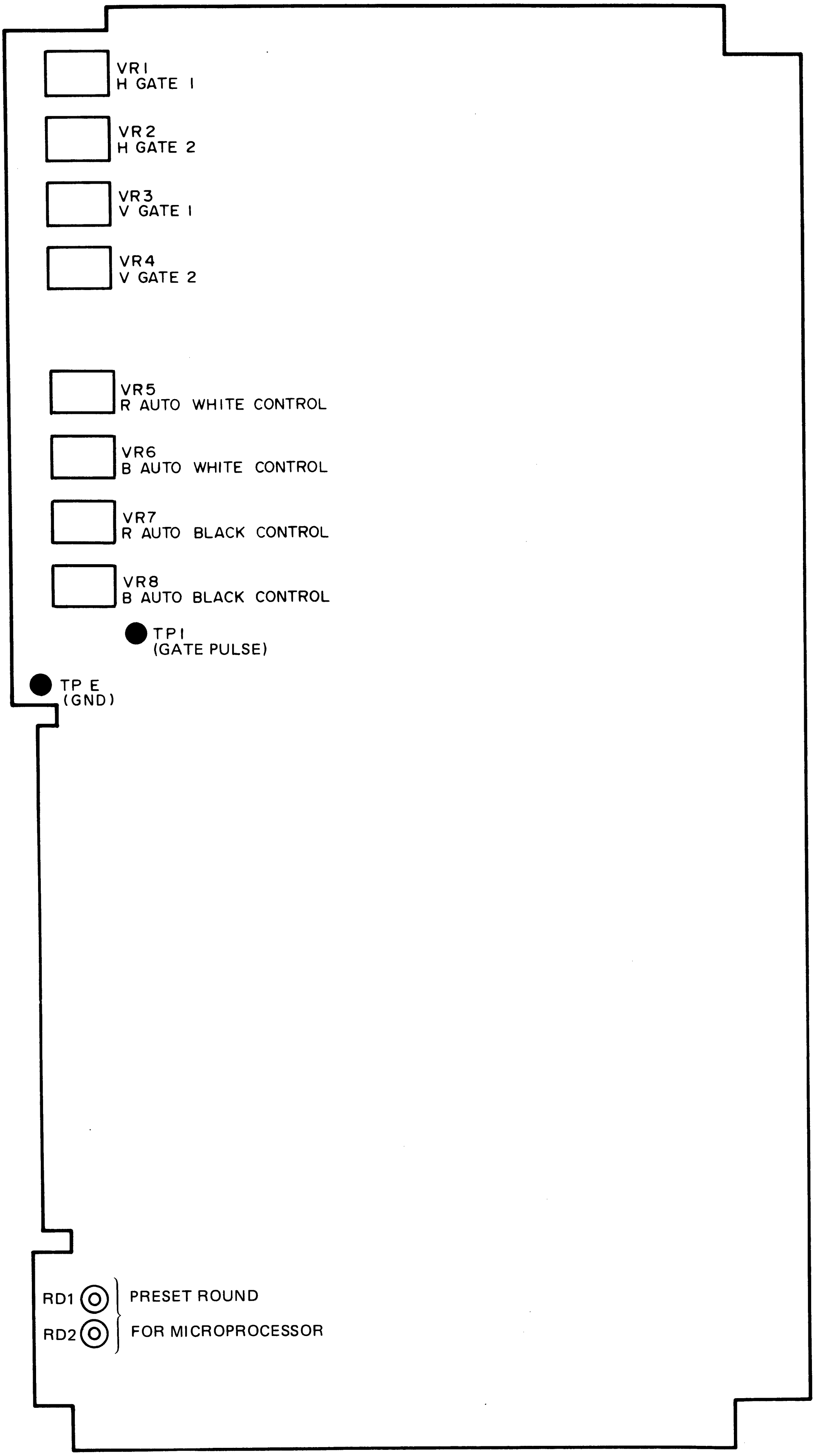
PROCESS-2 BOARD — Component Side —


TP1 (G)
VR6
G GAIN
VR9
R GAIN
TP2
(R)
VR3
B GAIN
TP3
(B)
VR11
G WHITE
CLIP
VR15
INDICATOR
LEVEL
VR13
R WHITE
CLIP
VR12
B WHITE
CLIP
VR5
G GAMMA
VR8
R GAMMA
VR2
B GAMMA
TP7 (AIC NAM OUT)
TP4 (G)
TP5 (R)
TP6 (B)
VR4
G PEDESTAL
VR7
R PEDESTAL
VR10
CORNER
GATE
LEVEL
VR1
B PEDESTAL
VR14
INDICATOR
DC LEVEL
TP8 (GND)

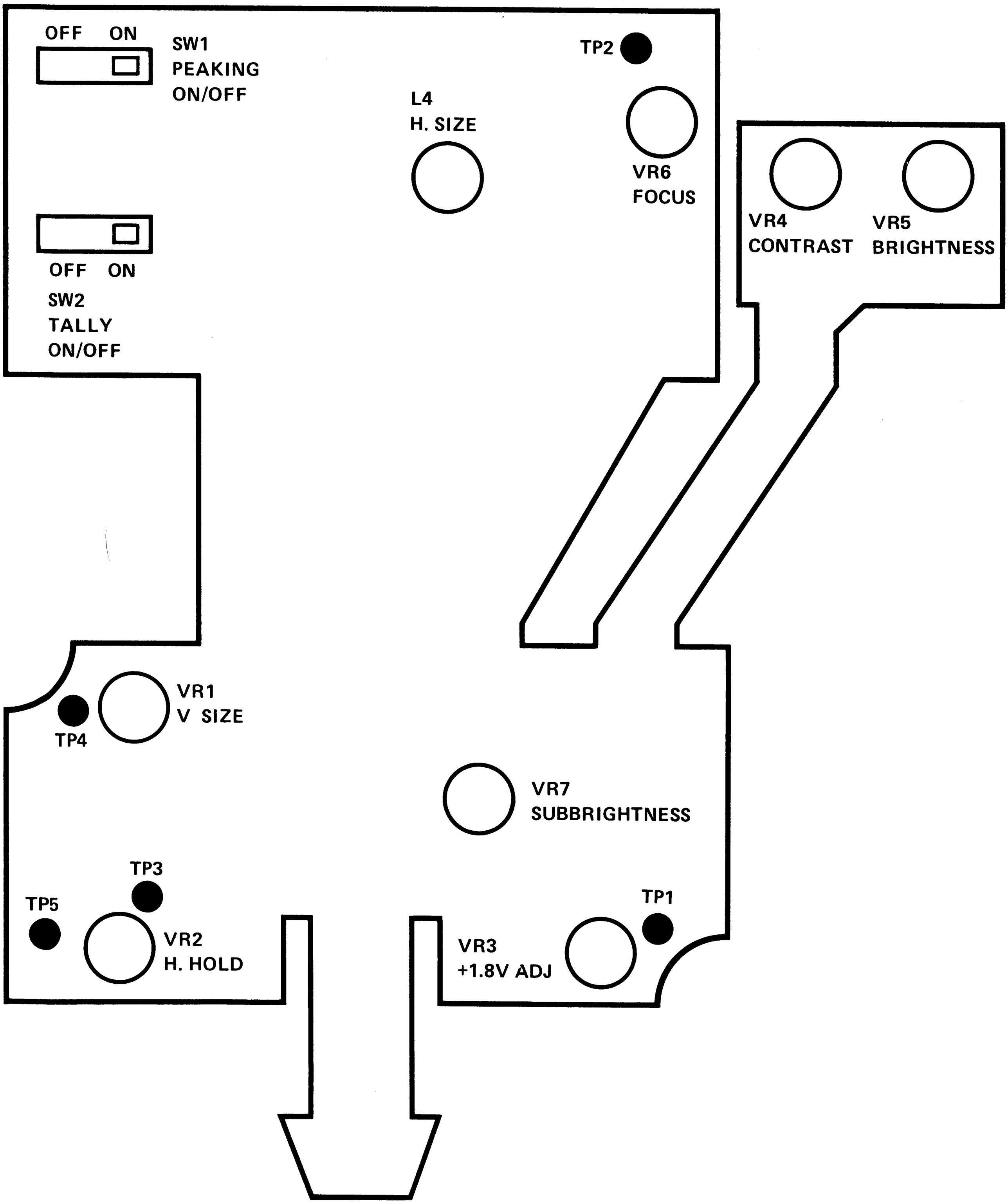
DETAIL BOARD —Component Side —


ON
OFF
SW1
DETAIL
ON/OFF
SWITCH
VR8
DETAIL GAIN
TP7
(DETAIL OUT)
VR7
NOISE
SUPPRESS
TP6(H. DETAIL)
VR6
LEVEL DEPENDENT
VR4
H. GAIN
TP5
(G OUT)
TP2
(2H)
TP1(1H)
VR5
H. BALANCE
TP4
(V. DETAIL)
VR1
PULSE MIX
VR3
V. GAIN
VR2
V. BLANCE
TP8
(GND)
TP3
(OH)
CT1
FREQ.
RESPONSE

AUTO BOARD — Component Side —


VR1
H GATE 1
VR2
H GATE 2
VR3
V GATE 1
VR4
V GATE 2
VR5
R AUTO WHITE CONTROL
VR6
B AUTO WHITE CONTROL
VR7
R AUTO BLACK CONTROL
VR8
B AUTO BLACK CONTROL
TP1
(GATE PULSE)
TP E
(GND)
RD1
RD2
PRESET ROUND
FOR MICROPROCESSOR

1.5" VIEWFINDER WV-VF32B —Component Side —

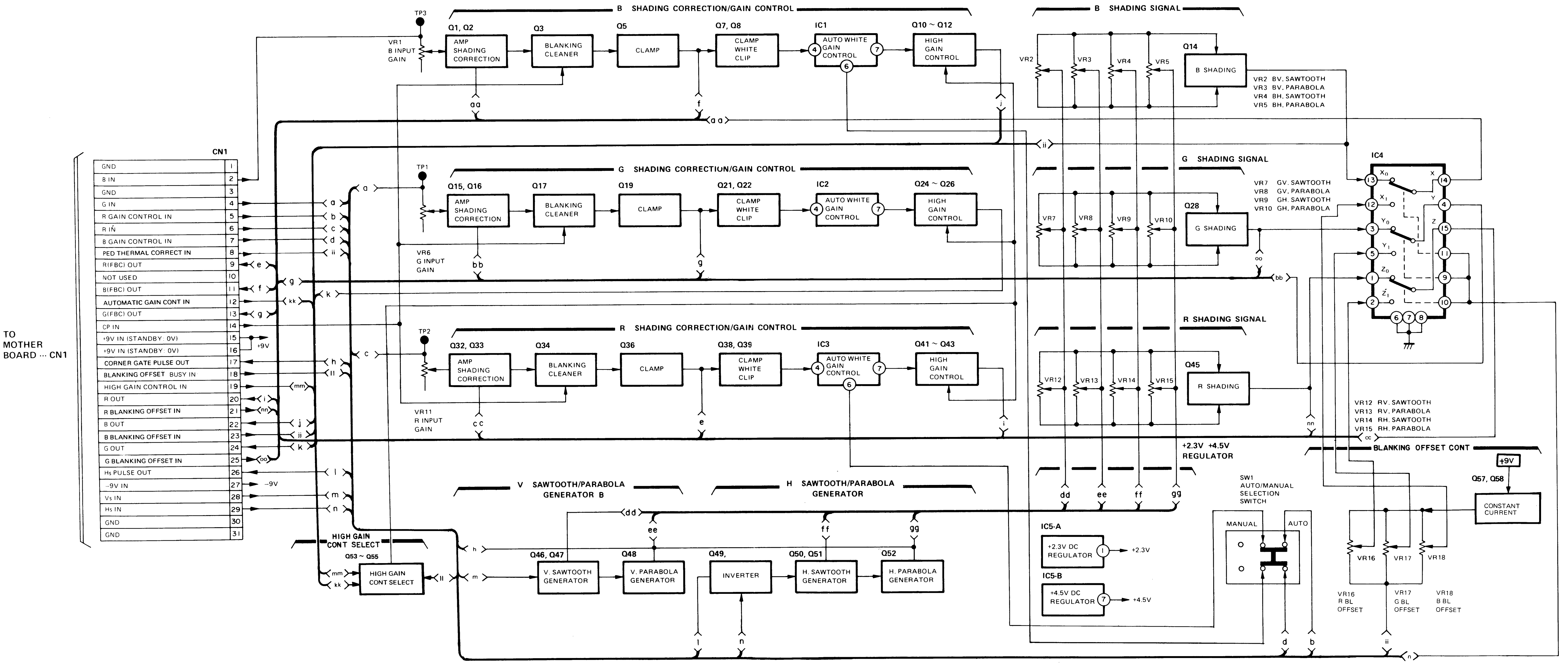

OFF ON
SW1
PEAKING
ON/OFF
TP2
L4
H. SIZE
VR6
FOCUS
VR4
CONTRAST
VR5
BRIGHTNESS
OFF ON
SW2
TALLY
ON/OFF
VR1
V SIZE
TP4
VR7
SUBBRIGHTNESS
TP3
TP5
VR2
H. HOLD
TP1
VR3
+1.8V ADJ

BLOCK DIAGRAM OF PROCESS-1 BOARD

Vol. 3

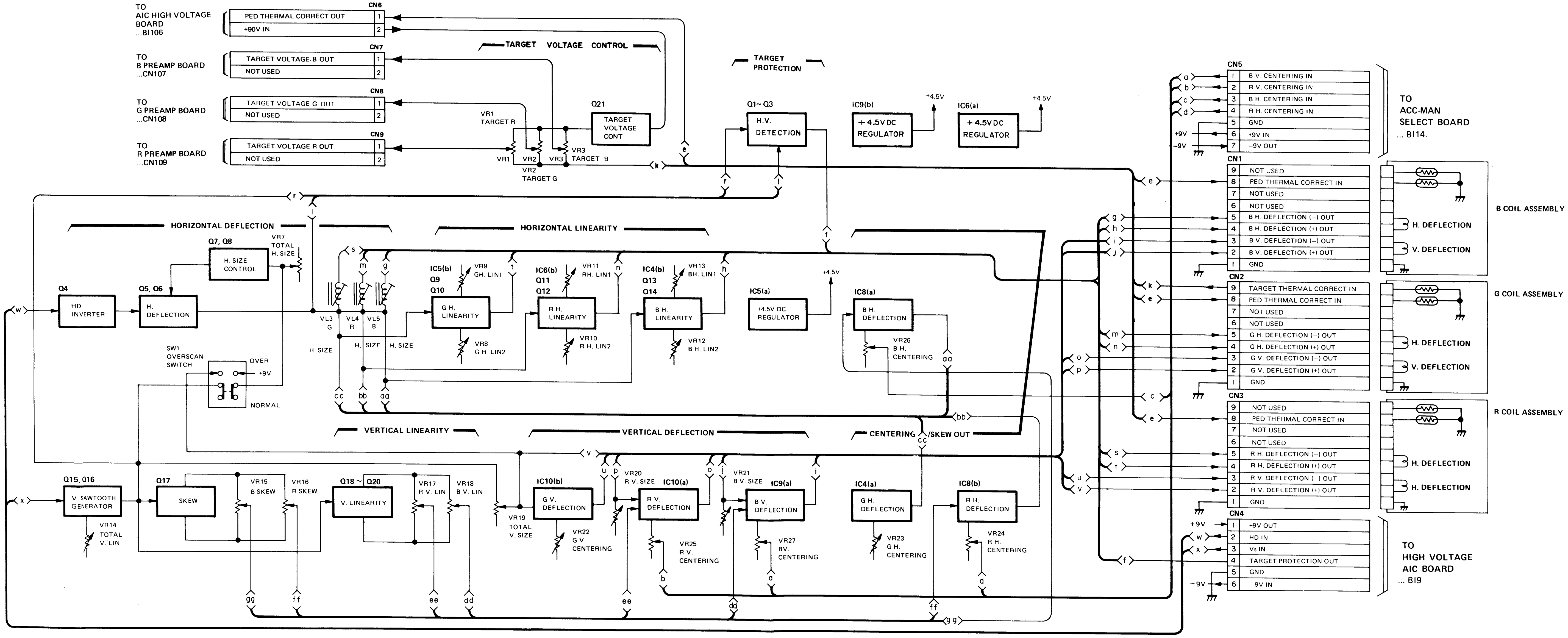
This Service Manual contains only defferent portion from followings Service Manual.

Original Service Manual WV-555 Series
Suppliment-1 Service Manual WV-555 Series
Suppliment-4 Service Manual WV-555 Series
Original Service Manual WV-555A/WV-555B Series

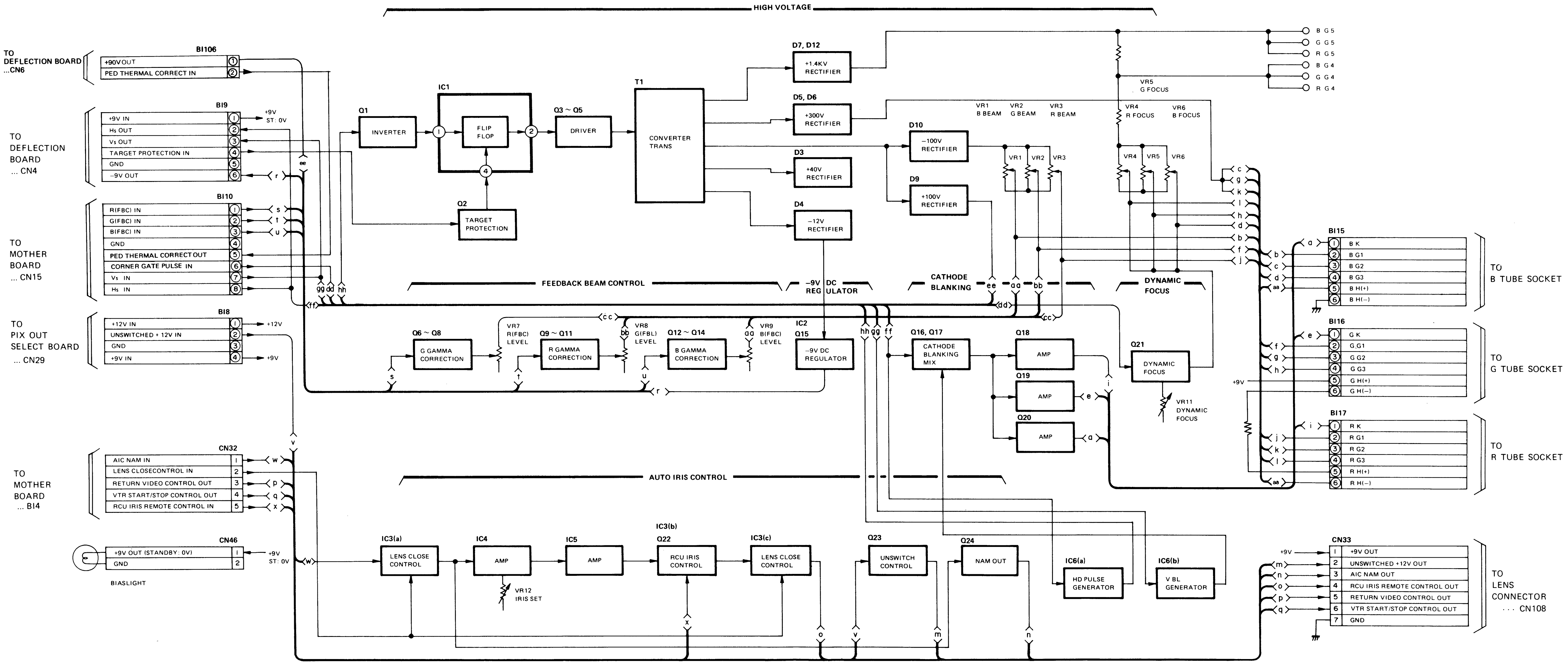


TO MOTHER BOARD ··· CN1
CN1
GND 1
B IN 2
GND 3
G IN 4
R GAIN CONTROL IN 5
R IN 6
B GAIN CONTROL IN 7
PED THERMAL CORRECT IN 8
R(FBC) OUT 9
NOT USED 10
B(FBC) OUT 11
AUTOMATIC GAIN CONT IN 12
G(FBC) OUT 13
CP IN 14
+9V IN (STANDBY: 0V) 15
+9V IN (STANDBY: 0V) 16
CORNER GATE PULSE OUT 17
BLANKING OFFSET BUSY IN 18
HIGH GAIN CONTROL IN 19
R OUT 20
R BLANKING OFFSET IN 21
B OUT 22
B BLANKING OFFSET IN 23
G OUT 24
G BLANKING OFFSET IN 25
Hs PULSE OUT 26
-9V IN 27
Vs IN 28
Hs IN 29
GND 30
GND 31
+9V
-9V
B SHADING CORRECTION/GAIN CONTROL
TP3
VR1 B INPUT GAIN
Q1, Q2
AMP SHADING CORRECTION
Q3
BLANKING CLEANER
Q5
CLAMP
Q7, Q8
CLAMP WHITE CLIP
IC1
AUTO WHITE GAIN CONTROL
Q10 ~ Q12
HIGH GAIN CONTROL
B SHADING SIGNAL
VR2
VR3
VR4
VR5
Q14
B SHADING
VR2 BV. SAWTOOTH
VR3 BV. PARABOLA
VR4 BH. SAWTOOTH
VR5 BH. PARABOLA
G SHADING CORRECTION/GAIN CONTROL
TP1
Q15, Q16
AMP SHADING CORRECTION
Q17
BLANKING CLEANER
Q19
CLAMP
Q21, Q22
CLAMP WHITE CLIP
IC2
AUTO WHITE GAIN CONTROL
Q24 ~ Q26
HIGH GAIN CONTROL
VR6 G INPUT GAIN
G SHADING SIGNAL
VR7
VR8
VR9
VR10
Q28
G SHADING
VR7 GV. SAWTOOTH
VR8 GV. PARABOLA
VR9 GH. SAWTOOTH
VR10 GH. PARABOLA
IC4
R SHADING CORRECTION/GAIN CONTROL
TP2
Q32, Q33
AMP SHADING CORRECTION
Q34
BLANKING CLEANER
Q36
CLAMP
Q38, Q39
CLAMP WHITE CLIP
IC3
AUTO WHITE GAIN CONTROL
Q41 ~ Q43
HIGH GAIN CONTROL
VR11 R INPUT GAIN
R SHADING SIGNAL
VR12
VR13
VR14
VR15
Q45
R SHADING
VR12 RV. SAWTOOTH
VR13 RV. PARABOLA
VR14 RH. SAWTOOTH
VR15 RH. PARABOLA
BLANKING OFFSET CONT
+9V
Q57, Q58
CONSTANT CURRENT
VR16
VR17
VR18
VR16 R BL OFFSET
VR17 G BL OFFSET
VR18 B BL OFFSET
+2.3V +4.5V REGULATOR
IC5-A
+2.3V DC REGULATOR
+2.3V
IC5-B
+4.5V DC REGULATOR
+4.5V
SW1 AUTO/MANUAL SELECTION SWITCH
MANUAL
AUTO
V SAWTOOTH/PARABOLA GENERATOR B
H SAWTOOTH/PARABOLA GENERATOR
Q46, Q47
V. SAWTOOTH GENERATOR
Q48
V. PARABOLA GENERATOR
Q49,
INVERTER
Q50, Q51
H. SAWTOOTH GENERATOR
Q52
H. PARABOLA GENERATOR
HIGH GAIN CONT SELECT
Q53 ~ Q55
HIGH GAIN CONT SELECT
aa
bb
cc
dd
ee
ff
gg
ii
kk
mm
nn
oo

BLOCK DIAGRAM OF DEFLECTION BOARD

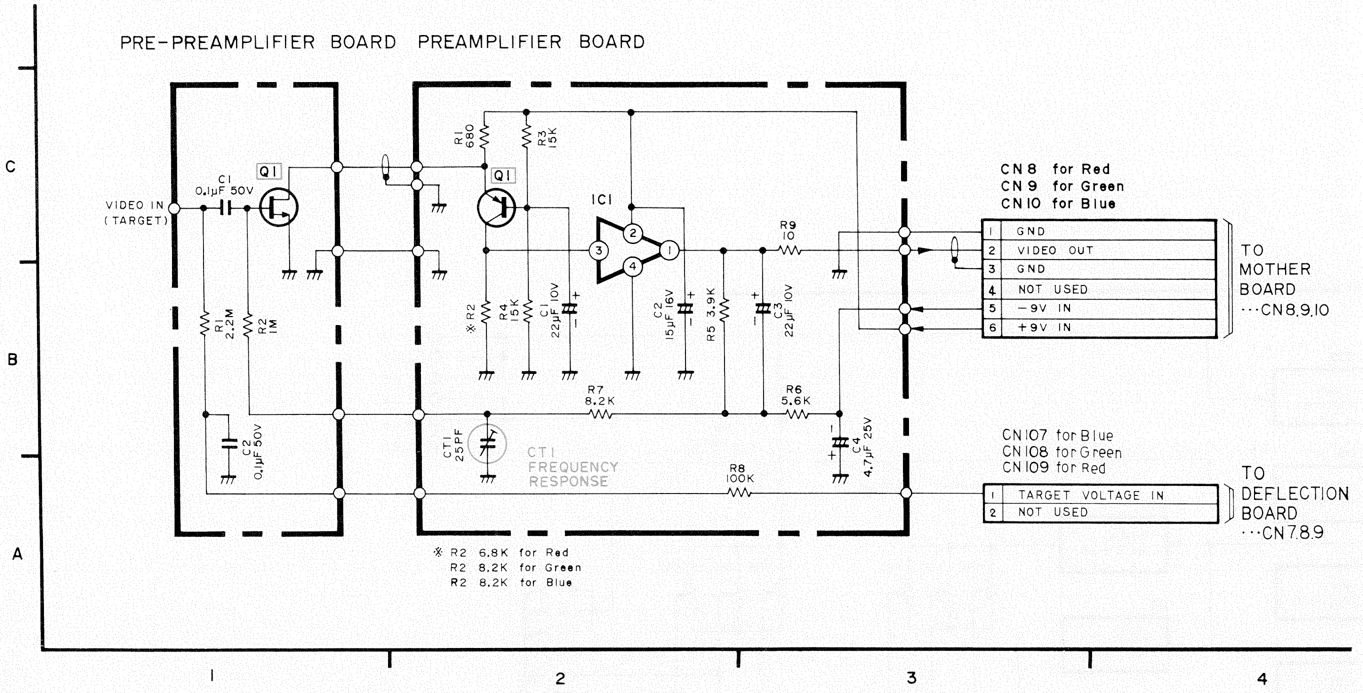

TO
AIC HIGH VOLTAGE
BOARD
...BI106
CN6
PED THERMAL CORRECT OUT 1
+90V IN 2
TO
B PREAMP BOARD
...CN107
CN7
TARGET VOLTAGE B OUT 1
NOT USED 2
TO
G PREAMP BOARD
...CN108
CN8
TARGET VOLTAGE G OUT 1
NOT USED 2
TO
R PREAMP BOARD
...CN109
CN9
TARGET VOLTAGE R OUT 1
NOT USED 2
TARGET VOLTAGE CONTROL
VR1
TARGET R
VR2
TARGET G
VR3
TARGET B
Q21
TARGET VOLTAGE CONT
TARGET PROTECTION
Q1~Q3
H.V. DETECTION
IC9(b)
+4.5V DC REGULATOR
+4.5V
IC6(a)
+4.5V DC REGULATOR
+4.5V
HORIZONTAL DEFLECTION
Q4
HD INVERTER
Q5, Q6
H. DEFLECTION
Q7, Q8
H. SIZE CONTROL
VR7
TOTAL
H. SIZE
SW1
OVERSCAN
SWITCH
OVER
+9V
NORMAL
VL3 G
VL4 R
VL5 B
H. SIZE
H. SIZE
H. SIZE
HORIZONTAL LINEARITY
IC5(b)
Q9
Q10
G H. LINEARITY
VR9
GH. LIN1
VR8
G H. LIN2
IC6(b)
Q11
Q12
R H. LINEARITY
VR11
RH. LIN1
VR10
R H. LIN2
IC4(b)
Q13
Q14
B H. LINEARITY
VR13
BH. LIN1
VR12
B H. LIN2
IC5(a)
+4.5V DC REGULATOR
+4.5V
IC8(a)
B H. DEFLECTION
VR26
B H.
CENTERING
VERTICAL LINEARITY
Q15, Q16
V. SAWTOOTH GENERATOR
VR14
TOTAL
V. LIN
Q17
SKEW
VR15
B SKEW
VR16
R SKEW
Q18 ~ Q20
V. LINEARITY
VR17
R V. LIN
VR18
B V. LIN
VR19
TOTAL
V. SIZE
VERTICAL DEFLECTION
IC10(b)
G V. DEFLECTION
VR22
G V.
CENTERING
VR20
R V. SIZE
IC10(a)
R V. DEFLECTION
VR25
R V.
CENTERING
VR21
B V. SIZE
IC9(a)
B V. DEFLECTION
VR27
BV.
CENTERING
CENTERING/SKEW OUT
IC4(a)
G H. DEFLECTION
VR23
G H.
CENTERING
IC8(b)
R H. DEFLECTION
VR24
R H.
CENTERING
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
r
s
t
u
v
w
x
aa
bb
cc
dd
ee
ff
gg
CN5
1 B V. CENTERING IN
2 R V. CENTERING IN
3 B H. CENTERING IN
4 R H. CENTERING IN
5 GND
6 +9V IN
7 −9V OUT
+9V
−9V
TO
ACC-MAN
SELECT BOARD
... BI14.
CN1
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 B H. DEFLECTION (−) OUT
4 B H. DEFLECTION (+) OUT
3 B V. DEFLECTION (−) OUT
2 B V. DEFLECTION (+) OUT
1 GND
B COIL ASSEMBLY
H. DEFLECTION
V. DEFLECTION
CN2
9 TARGET THERMAL CORRECT IN
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 G H. DEFLECTION (−) OUT
4 G H. DEFLECTION (+) OUT
3 G V. DEFLECTION (−) OUT
2 G V. DEFLECTION (+) OUT
1 GND
G COIL ASSEMBLY
H. DEFLECTION
V. DEFLECTION
CN3
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 R H. DEFLECTION (−) OUT
4 R H. DEFLECTION (+) OUT
3 R V. DEFLECTION (−) OUT
2 R V. DEFLECTION (+) OUT
1 GND
R COIL ASSEMBLY
H. DEFLECTION
H. DEFLECTION
CN4
1 +9V OUT
2 HD IN
3 Vs IN
4 TARGET PROTECTION OUT
5 GND
6 −9V IN
+9V
−9V
TO
HIGH VOLTAGE
AIC BOARD
... BI9

BLOCK DIAGRAM OF HIGH VOLTAGE AIC BOARD



HIGH VOLTAGE
TO DEFLECTION BOARD ...CN6
BI106
+90V OUT
PED THERMAL CORRECT IN
TO DEFLECTION BOARD ... CN4
BI9
+9V IN
Hs OUT
Vs OUT
TARGET PROTECTION IN
GND
-9V OUT
+9V ST: 0V
TO MOTHER BOARD ... CN15
BI10
R(FBC) IN
G(FBC) IN
B(FBC) IN
GND
PED THERMAL CORRECT OUT
CORNER GATE PULSE IN
Vs IN
Hs IN
TO PIX OUT SELECT BOARD ... CN29
BI8
+12V IN
UNSWITCHED + 12V IN
GND
+9V IN
+12V
+9V
TO MOTHER BOARD ... BI4
CN32
AIC NAM IN
LENS CLOSECONTROL IN
RETURN VIDEO CONTROL OUT
VTR START/STOP CONTROL OUT
RCU IRIS REMOTE CONTROL IN
CN46
+9V OUT (STANDBY: 0V)
GND
+9V ST: 0V
BIASLIGHT
Q1
INVERTER
IC1
FLIP FLOP
Q2
TARGET PROTECTION
Q3 ~ Q5
DRIVER
T1
CONVERTER TRANS
D7, D12
+1.4KV RECTIFIER
D5, D6
+300V RECTIFIER
D3
+40V RECTIFIER
D4
-12V RECTIFIER
D10
-100V RECTIFIER
D9
+100V RECTIFIER
VR1 B BEAM
VR2 G BEAM
VR3 R BEAM
VR4 R FOCUS
VR5 G FOCUS
VR6 B FOCUS
B G5
G G5
R G5
B G4
G G4
R G4
FEEDBACK BEAM CONTROL
-9V DC REGULATOR
CATHODE BLANKING
DYNAMIC FOCUS
Q6 ~ Q8
G GAMMA CORRECTION
VR7 R(FBC) LEVEL
Q9 ~ Q11
R GAMMA CORRECTION
VR8 G(FBL) LEVEL
Q12 ~ Q14
B GAMMA CORRECTION
VR9 B(FBC) LEVEL
IC2 Q15
-9V DC REGULATOR
Q16, Q17
CATHODE BLANKING MIX
Q18
AMP
Q19
AMP
Q20
AMP
Q21
DYNAMIC FOCUS
VR11 DYNAMIC FOCUS
+9V
BI15
B K
B G1
B G2
B G3
B H(+)
B H(−)
TO B TUBE SOCKET
BI16
G K
G G1
G G2
G G3
G H(+)
G H(−)
TO G TUBE SOCKET
BI17
R K
R G1
R G2
R G3
R H(+)
R H(−)
TO R TUBE SOCKET
AUTO IRIS CONTROL
IC3(a)
LENS CLOSE CONTROL
IC4
AMP
VR12 IRIS SET
IC5
AMP
IC3(b) Q22
RCU IRIS CONTROL
IC3(c)
LENS CLOSE CONTROL
Q23
UNSWITCH CONTROL
Q24
NAM OUT
IC6(a)
HD PULSE GENERATOR
IC6(b)
V BL GENERATOR
CN33
+9V OUT
UNSWITCHED +12V OUT
AIC NAM OUT
RCU IRIS REMOTE CONTROL OUT
RETURN VIDEO CONTROL OUT
VTR START/STOP CONTROL OUT
GND
TO LENS CONNECTOR ... CN108

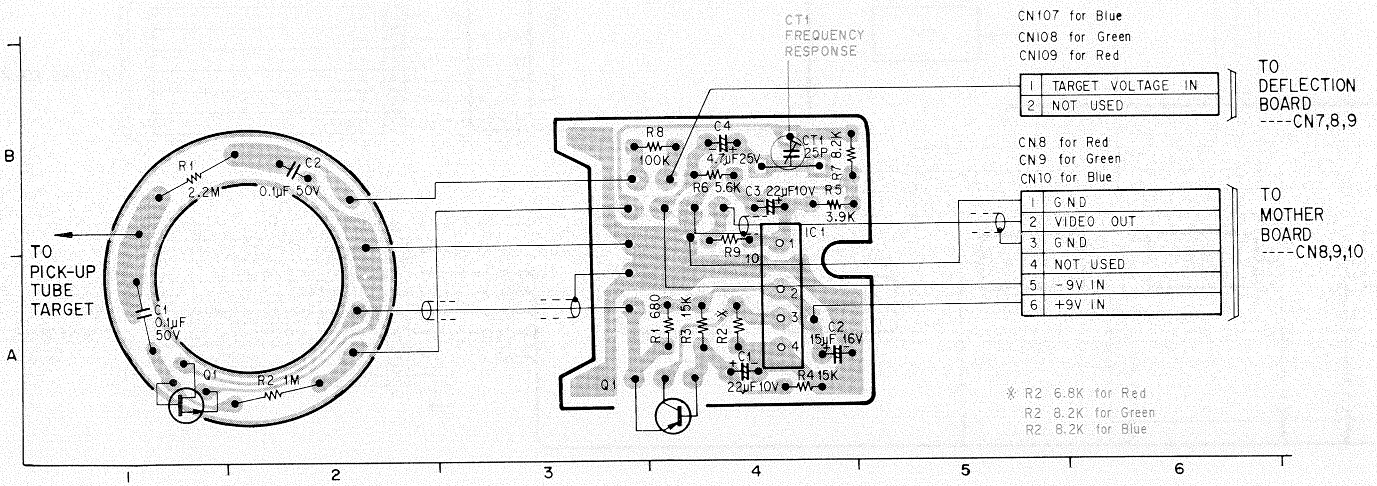
SCHEMATIC DIAGRAM OF PRE-PREAMPLIFIER AND PREAMPLIFIER BOARD


PRE-PREAMPLIFIER BOARD
PREAMPLIFIER BOARD
VIDEO IN (TARGET)
C1 0.1μF 50V
Q1
R1 2.2M
R2 1M
C2 0.1μF 50V
R1 680
R3 15K
Q1
IC1
※ R2
R4 15K
C1 22μF 10V
C2 15μF 16V
R5 3.9K
C3 22μF 10V
R9 10
R7 8.2K
R6 5.6K
CT1 25PF
CT1 FREQUENCY RESPONSE
R8 100K
C4 4.7μF 25V
CN8 for Red
CN9 for Green
CN10 for Blue
1 GND
2 VIDEO OUT
3 GND
4 NOT USED
5 −9V IN
6 +9V IN
TO MOTHER BOARD ···CN8,9,10
CN107 for Blue
CN108 for Green
CN109 for Red
1 TARGET VOLTAGE IN
2 NOT USED
TO DEFLECTION BOARD ···CN7,8,9
※ R2 6.8K for Red
R2 8.2K for Green
R2 8.2K for Blue
A
B
C
1
2
3
4

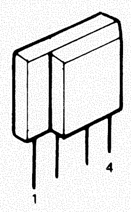
Pre-Preampier Board			
Q1	2SK197YDE	(YC)	C1

Preamplifier Boarder		
IC1	AN608P	B2
Q1	2SA1254-BC	C1

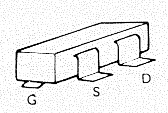
CONDUCTOR VIEW OF PRE-PREAMPLIFIER AND PREAMPLIFIER BOARD


TO PICK-UP TUBE TARGET
R1 2.2M
C2 0.1μF 50V
C1 0.1μF 50V
Q1
R2 1M
CT1 FREQUENCY RESPONSE
R8 100K
C4 4.7μF 25V
CT1 25P
R7 8.2K
R6 5.6K
C3 22μF 10V
R5 3.9K
R9 10
IC1
R1 680
R3 15K
R2 ※
C1 22μF 10V
C2 15μF 16V
R4 15K
Q1
CN107 for Blue
CN108 for Green
CN109 for Red
1 TARGET VOLTAGE IN
2 NOT USED
TO DEFLECTION BOARD ----CN7,8,9
CN8 for Red
CN9 for Green
CN10 for Blue
1 GND
2 VIDEO OUT
3 GND
4 NOT USED
5 −9V IN
6 +9V IN
TO MOTHER BOARD ----CN8,9,10
※ R2 6.8K for Red
R2 8.2K for Green
R2 8.2K for Blue
A
B
1
2
3
4
5
6

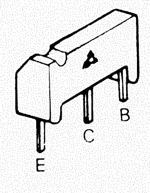
AN608P



2SK197YDE



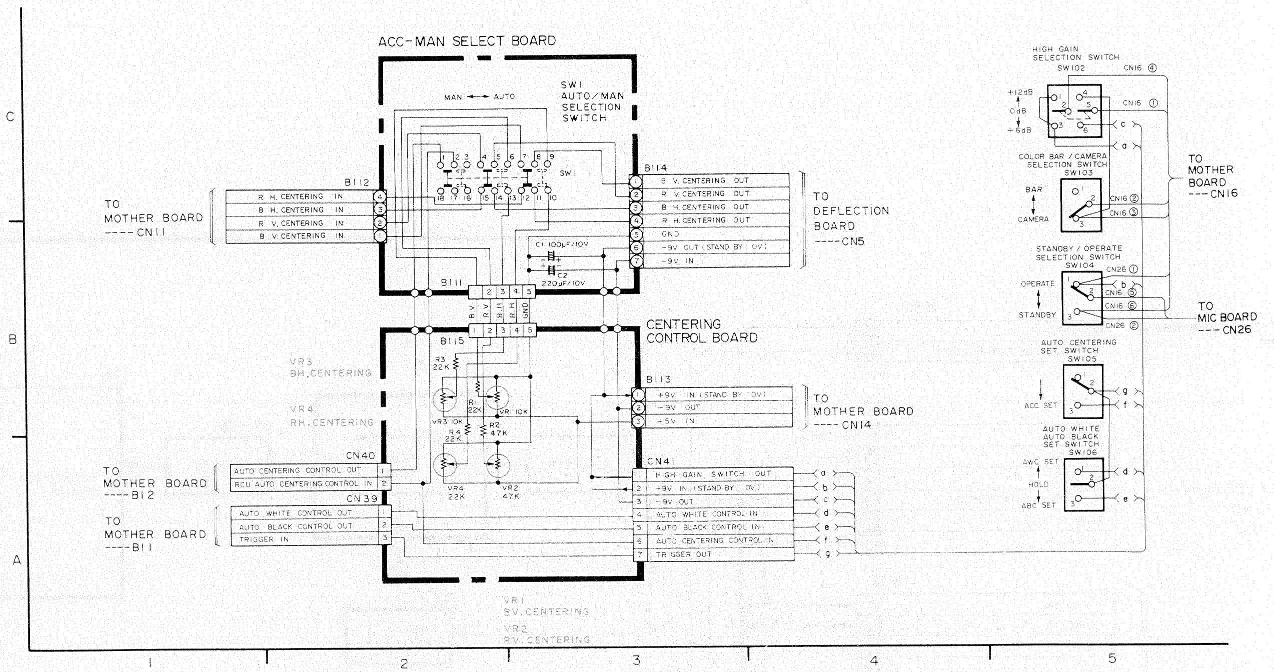
2SA1254-BC



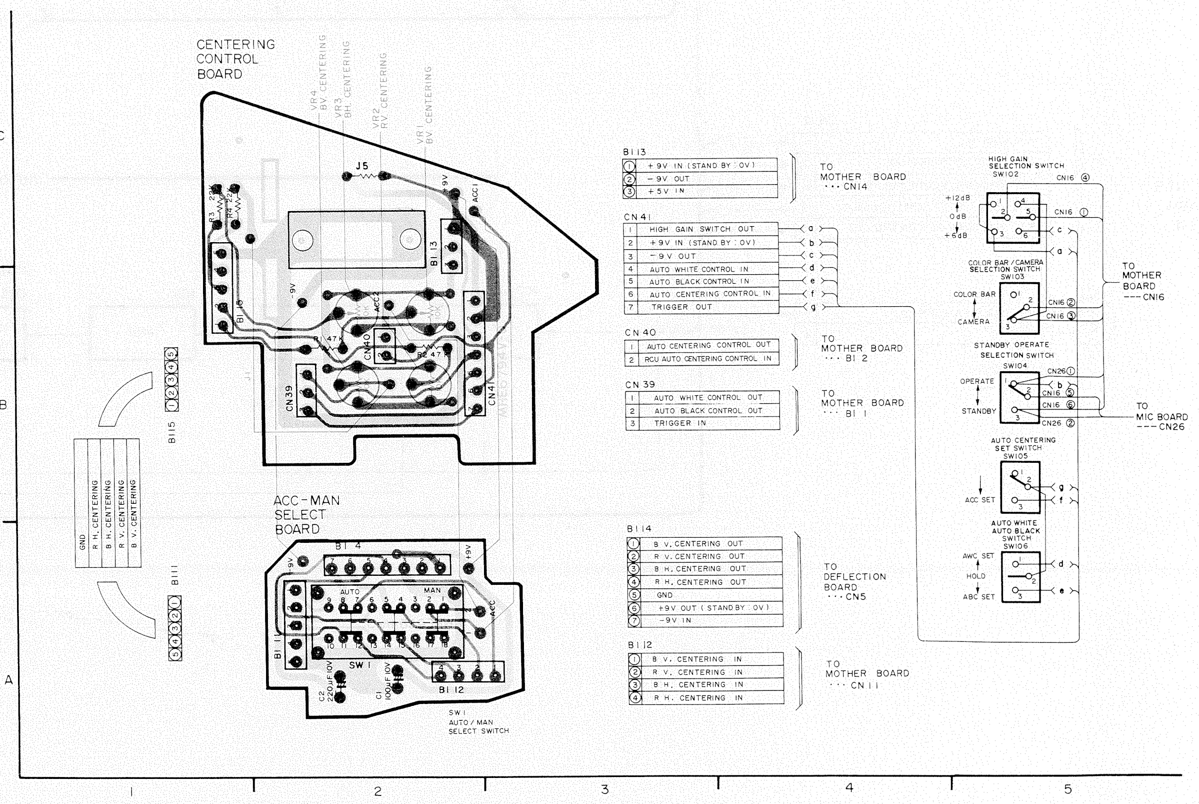
Pre-Preamplifier Board			
Q1	2SK197YDE	(YC)	A1

Preamplifier		
IC1	AN608P	A4
Q1	2SA1254-BC	A4

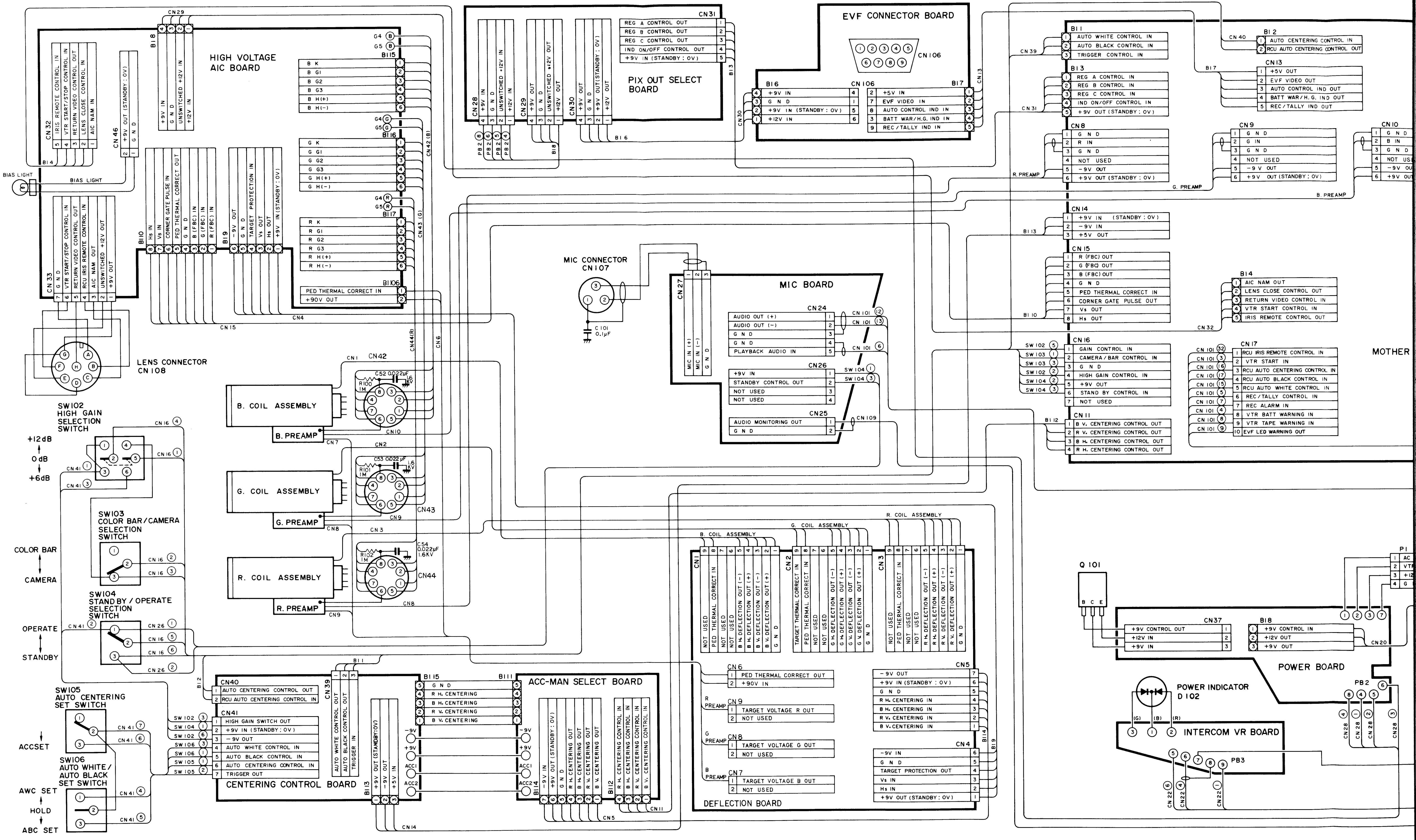
SCHEMATIC DIAGRAM OF CENTERING AND ACC-MAN SELECT BOARD


ACC-MAN SELECT BOARD
MAN ←→ AUTO
SW1 AUTO/MAN SELECTION SWITCH
SW1
B112
4 R H. CENTERING IN
3 B H. CENTERING IN
2 R V. CENTERING IN
1 B V. CENTERING IN
TO MOTHER BOARD ----CN11
B114
1 B V. CENTERING OUT
2 R V. CENTERING OUT
3 B H. CENTERING OUT
4 R H. CENTERING OUT
5 GND
6 +9V OUT (STAND BY : 0V)
7 −9V IN
TO DEFLECTION BOARD ----CN5
C1 100μF/10V
C2 220μF/10V
B111
B115
B.V R.V B.H R.H GND
CENTERING CONTROL BOARD
VR3 BH.CENTERING
VR4 RH.CENTERING
R3 22K
R1 22K
VR1 10K
VR3 10K
R4 22K
R2 47K
VR4 22K
VR2 47K
B113
1 +9V IN (STAND BY : 0V)
2 −9V OUT
3 +5V IN
TO MOTHER BOARD ----CN14
CN40
1 AUTO CENTERING CONTROL OUT
2 RCU AUTO CENTERING CONTROL IN
TO MOTHER BOARD ----B12
CN39
1 AUTO WHITE CONTROL OUT
2 AUTO BLACK CONTROL OUT
3 TRIGGER IN
TO MOTHER BOARD ----B11
CN41
1 HIGH GAIN SWITCH OUT
2 +9V IN (STAND BY : 0V)
3 −9V OUT
4 AUTO WHITE CONTROL IN
5 AUTO BLACK CONTROL IN
6 AUTO CENTERING CONTROL IN
7 TRIGGER OUT
VR1 BV.CENTERING
VR2 RV.CENTERING
HIGH GAIN SELECTION SWITCH SW102
+12dB
0dB
+6dB
CN16 ④
CN16 ①
COLOR BAR / CAMERA SELECTION SWITCH SW103
BAR
CAMERA
CN16 ②
CN16 ③
TO MOTHER BOARD ---CN16
STANDBY / OPERATE SELECTION SWITCH SW104
OPERATE
STANDBY
CN26 ①
CN16 ⑤
CN16 ⑥
CN26 ②
TO MIC BOARD ---CN26
AUTO CENTERING SET SWITCH SW105
ACC SET
AUTO WHITE AUTO BLACK SET SWITCH SW106
AWC SET
HOLD
ABC SET
a
b
c
d
e
f
g
A
B
C
1
2
3
4
5

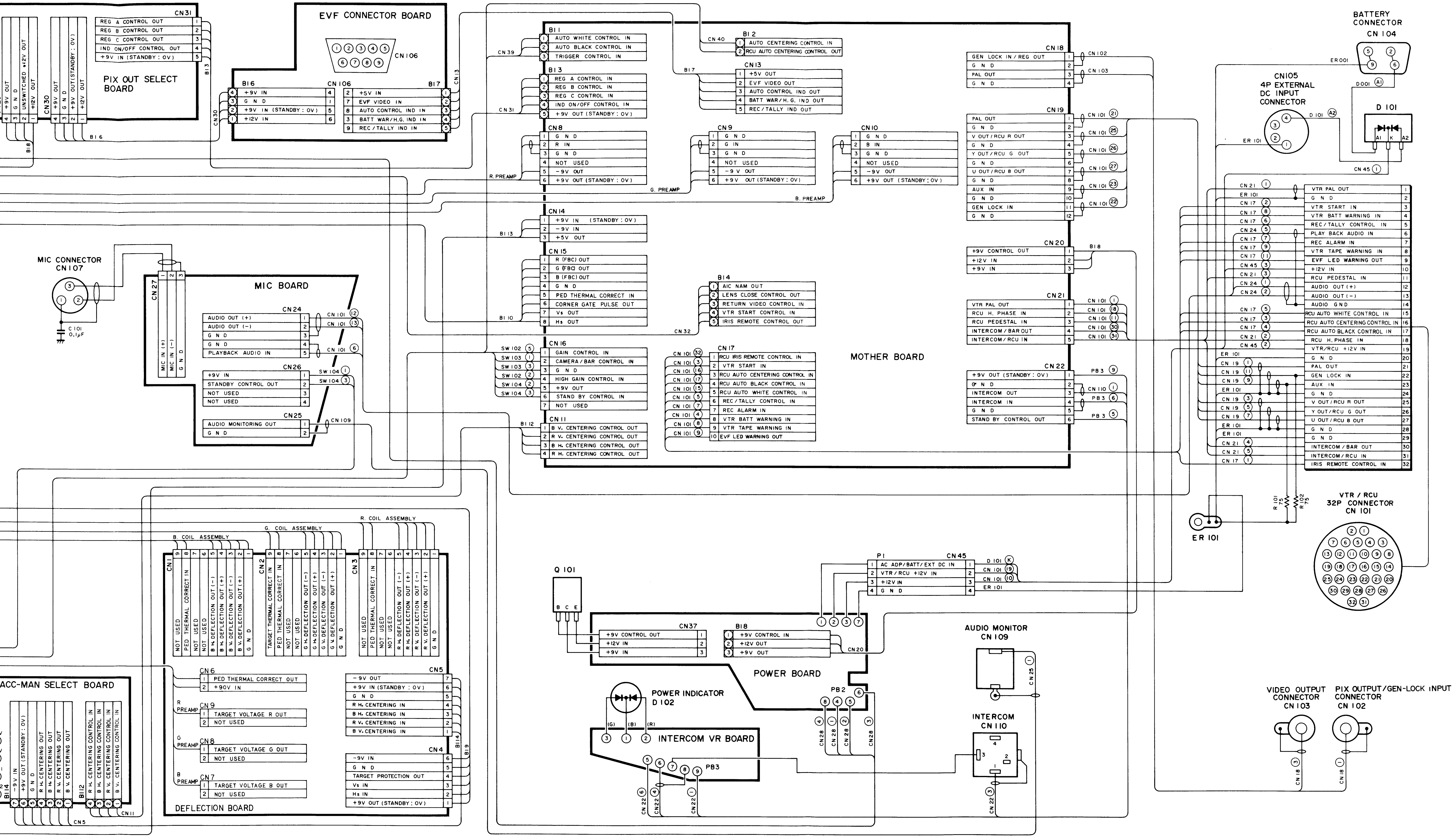
CONDUCTOR VIEW OF CENTERING AND ACC-MAN SELECT BOARD


CENTERING CONTROL BOARD
VR4 BV CENTERING
VR3 BH. CENTERING
VR2 RV. CENTERING
VR1 BV. CENTERING
J5
R3 22K
R4 22K
B113
B116
CN40
CN39
CN41
R1 47K
R2 47K
ACC1
ACC2
+9V
−9V
B115
B111
GND
R H. CENTERING
B H. CENTERING
R V. CENTERING
B V. CENTERING
ACC-MAN SELECT BOARD
B114
B111
AUTO
MAN
ACC
SW1
B112
C2 220μF10V
C1 100μF 10V
SW1 AUTO / MAN SELECT SWITCH
B113
① +9V IN (STAND BY : 0V)
② −9V OUT
③ +5V IN
TO MOTHER BOARD ···CN14
CN41
1 HIGH GAIN SWITCH OUT
2 +9V IN (STAND BY : 0V)
3 −9V OUT
4 AUTO WHITE CONTROL IN
5 AUTO BLACK CONTROL IN
6 AUTO CENTERING CONTROL IN
7 TRIGGER OUT
CN40
1 AUTO CENTERING CONTROL OUT
2 RCU AUTO CENTERING CONTROL IN
TO MOTHER BOARD ··· B12
CN39
1 AUTO WHITE CONTROL OUT
2 AUTO BLACK CONTROL OUT
3 TRIGGER IN
TO MOTHER BOARD ··· B11
B114
① B V. CENTERING OUT
② R V. CENTERING OUT
③ B H. CENTERING OUT
④ R H. CENTERING OUT
⑤ GND
⑥ +9V OUT (STAND BY : 0V)
⑦ −9V IN
TO DEFLECTION BOARD ···CN5
B112
① B V. CENTERING IN
② R V. CENTERING IN
③ B H. CENTERING IN
④ R H. CENTERING IN
TO MOTHER BOARD ···CN11
HIGH GAIN SELECTION SWITCH SW102
+12dB
0dB
+6dB
CN16 ④
CN16 ①
COLOR BAR / CAMERA SELECTION SWITCH SW103
COLOR BAR
CAMERA
CN16 ②
CN16 ③
TO MOTHER BOARD ---CN16
STANDBY OPERATE SELECTION SWITCH SW104
OPERATE
STANDBY
CN26 ①
CN16 ⑤
CN16 ⑥
CN26 ②
TO MIC BOARD ---CN26
AUTO CENTERING SET SWITCH SW105
ACC SET
AUTO WHITE AUTO BLACK SWITCH SW106
AWC SET
HOLD
ABC SET
a
b
c
d
e
f
g
A
B
C
1
2
3
4
5

WIRING DIAGRAM


HIGH VOLTAGE AIC BOARD
PIX OUT SELECT BOARD
EVF CONNECTOR BOARD
CN106
MIC CONNECTOR CN107
MIC BOARD
LENS CONNECTOR CN108
BIAS LIGHT
B. COIL ASSEMBLY
B. PREAMP
G. COIL ASSEMBLY
G. PREAMP
R. COIL ASSEMBLY
R. PREAMP
SW102 HIGH GAIN SELECTION SWITCH
+12dB
0dB
+6dB
SW103 COLOR BAR/CAMERA SELECTION SWITCH
COLOR BAR
CAMERA
SW104 STAND BY / OPERATE SELECTION SWITCH
OPERATE
STANDBY
SW105 AUTO CENTERING SET SWITCH
ACCSET
SW106 AUTO WHITE / AUTO BLACK SET SWITCH
AWC SET
HOLD
ABC SET
CENTERING CONTROL BOARD
ACC-MAN SELECT BOARD
DEFLECTION BOARD
MOTHER
POWER BOARD
Q101
B C E
POWER INDICATOR D102
INTERCOM VR BOARD
PB2
PB3
REG A CONTROL OUT
REG B CONTROL OUT
REG C CONTROL OUT
IND ON/OFF CONTROL OUT
+9V IN (STANDBY : 0V)
AUTO WHITE CONTROL IN
AUTO BLACK CONTROL IN
TRIGGER CONTROL IN
AUTO CENTERING CONTROL IN
RCU AUTO CENTERING CONTROL OUT
+5V OUT
EVF VIDEO OUT
AUTO CONTROL IND OUT
BATT WAR/H.G. IND OUT
REC/TALLY IND OUT
AUDIO OUT (+)
AUDIO OUT (−)
PLAYBACK AUDIO IN
STANDBY CONTROL OUT
AUDIO MONITORING OUT
PED THERMAL CORRECT IN
+90V OUT
TARGET VOLTAGE R OUT
TARGET VOLTAGE G OUT
TARGET VOLTAGE B OUT
+9V CONTROL OUT
+12V IN
+9V IN
C101 0.1μF
C52 0.022μF 1.6KV
C53 0.022μF 1.6KV
C54 0.022μF 1.6KV
R100 1M
R101 1M
R102 1M

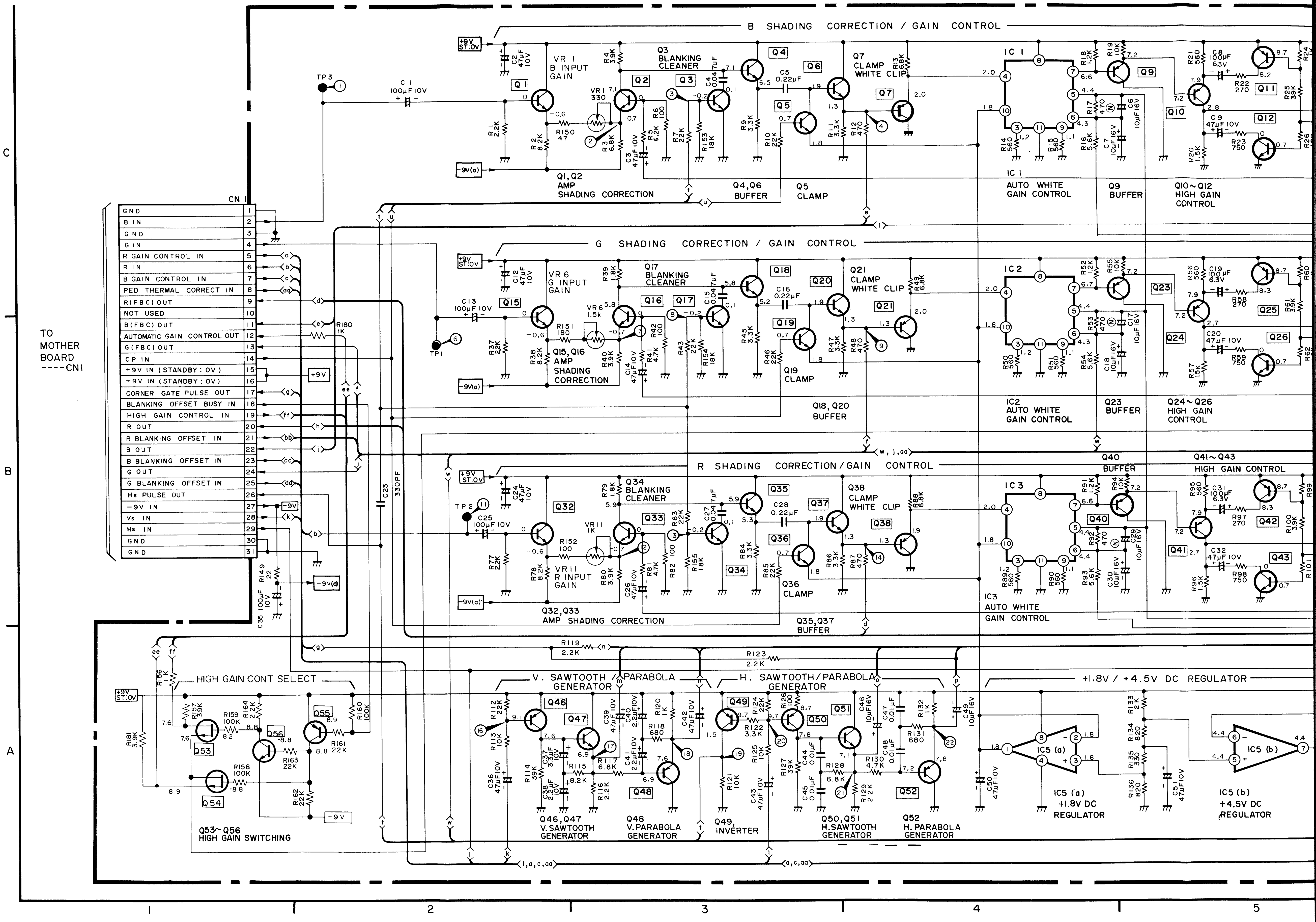
WIRING DIAGRAM


PIX OUT SELECT BOARD
CN31
REG A CONTROL OUT
REG B CONTROL OUT
REG C CONTROL OUT
IND ON/OFF CONTROL OUT
+9V IN (STANDBY : OV)
CN30
EVF CONNECTOR BOARD
CN106
B16
B17
+9V IN
G N D
+9V IN (STANDBY : OV)
+12V IN
+5V IN
EVF VIDEO IN
AUTO CONTROL IND IN
BATT WAR/H.G. IND IN
REC/TALLY IND IN
MIC CONNECTOR CN107
C101 0.1μF
MIC BOARD
CN27
CN24
AUDIO OUT (+)
AUDIO OUT (−)
G N D
PLAYBACK AUDIO IN
CN26
+9V IN
STANDBY CONTROL OUT
NOT USED
CN25
AUDIO MONITORING OUT
MOTHER BOARD
B11
AUTO WHITE CONTROL IN
AUTO BLACK CONTROL IN
TRIGGER CONTROL IN
B13
REG A CONTROL IN
REG B CONTROL IN
REG C CONTROL IN
IND ON/OFF CONTROL IN
+9V OUT (STANDBY : OV)
B12
AUTO CENTERING CONTROL IN
RCU AUTO CENTERING CONTROL OUT
CN13
+5V OUT
EVF VIDEO OUT
AUTO CONTROL IND OUT
BATT WAR/H.G. IND OUT
REC/TALLY IND OUT
CN8
R IN
-9V OUT
+9V OUT (STANDBY : OV)
R. PREAMP
CN9
G IN
G. PREAMP
CN10
B IN
B. PREAMP
CN14
+9V IN (STANDBY : OV)
-9V IN
+5V OUT
CN15
R (FBC) OUT
G (FBC) OUT
B (FBC) OUT
PED THERMAL CORRECT IN
CORNER GATE PULSE OUT
Vs OUT
Hs OUT
B14
AIC NAM OUT
LENS CLOSE CONTROL OUT
RETURN VIDEO CONTROL IN
VTR START CONTROL IN
IRIS REMOTE CONTROL OUT
CN16
GAIN CONTROL IN
CAMERA/BAR CONTROL IN
HIGH GAIN CONTROL IN
+9V OUT
STAND BY CONTROL IN
CN11
B V. CENTERING CONTROL OUT
R V. CENTERING CONTROL OUT
B H. CENTERING CONTROL OUT
R H. CENTERING CONTROL OUT
CN17
RCU IRIS REMOTE CONTROL IN
VTR START IN
RCU AUTO CENTERING CONTROL IN
RCU AUTO BLACK CONTROL IN
RCU AUTO WHITE CONTROL IN
REC/TALLY CONTROL IN
REC ALARM IN
VTR BATT WARNING IN
VTR TAPE WARNING IN
EVF LED WARNING OUT
CN18
GEN LOCK IN/REG OUT
PAL OUT
CN19
V OUT/RCU R OUT
Y OUT/RCU G OUT
U OUT/RCU B OUT
AUX IN
GEN LOCK IN
CN20
+9V CONTROL OUT
+12V IN
+9V IN
CN21
VTR PAL OUT
RCU H. PHASE IN
RCU PEDESTAL IN
INTERCOM/BAR OUT
INTERCOM/RCU IN
CN22
+9V OUT (STANDBY : OV)
INTERCOM OUT
INTERCOM IN
STAND BY CONTROL OUT
BATTERY CONNECTOR CN104
CN105 4P EXTERNAL DC INPUT CONNECTOR
D101
VTR/RCU 32P CONNECTOR CN101
VTR PAL OUT
VTR START IN
VTR BATT WARNING IN
REC/TALLY CONTROL IN
PLAY BACK AUDIO IN
REC ALARM IN
VTR TAPE WARNING IN
EVF LED WARNING OUT
+12V IN
RCU PEDESTAL IN
AUDIO OUT (+)
AUDIO OUT (−)
AUDIO GND
RCU AUTO WHITE CONTROL IN
RCU AUTO CENTERING CONTROL IN
RCU AUTO BLACK CONTROL IN
RCU H. PHASE IN
VTR/RCU +12V IN
GEN LOCK IN
V OUT/RCU R OUT
Y OUT/RCU G OUT
U OUT/RCU B OUT
INTERCOM/BAR OUT
INTERCOM/RCU IN
IRIS REMOTE CONTROL IN
ER 101
R101 75
R102 75
B. COIL ASSEMBLY
G. COIL ASSEMBLY
R. COIL ASSEMBLY
CN1
CN2
CN3
NOT USED
PED THERMAL CORRECT IN
TARGET THERMAL CORRECT IN
B H. DEFLECTION OUT (−)
B H. DEFLECTION OUT (+)
B V. DEFLECTION OUT (−)
B V. DEFLECTION OUT (+)
G H. DEFLECTION OUT (−)
G H. DEFLECTION OUT (+)
G V. DEFLECTION OUT (−)
G V. DEFLECTION OUT (+)
R H. DEFLECTION OUT (−)
R H. DEFLECTION OUT (+)
R V. DEFLECTION OUT (−)
R V. DEFLECTION OUT (+)
DEFLECTION BOARD
CN6
PED THERMAL CORRECT OUT
+90V IN
CN9
TARGET VOLTAGE R OUT
CN8
TARGET VOLTAGE G OUT
CN7
TARGET VOLTAGE B OUT
CN5
-9V OUT
+9V IN (STANDBY : OV)
R H. CENTERING IN
B H. CENTERING IN
R V. CENTERING IN
B V. CENTERING IN
CN4
-9V IN
TARGET PROTECTION OUT
Vs IN
Hs IN
+9V OUT (STANDBY : OV)
ACC-MAN SELECT BOARD
Q101
P1
CN45
AC ADP/BATT/EXT DC IN
VTR/RCU +12V IN
+12V IN
POWER BOARD
CN37
B18
+9V CONTROL OUT
+12V IN
+9V IN
+9V CONTROL IN
+12V OUT
+9V OUT
PB2
POWER INDICATOR D102
INTERCOM VR BOARD
PB3
AUDIO MONITOR CN109
INTERCOM CN110
VIDEO OUTPUT CONNECTOR CN103
PIX OUTPUT/GEN-LOCK INPUT CONNECTOR CN102

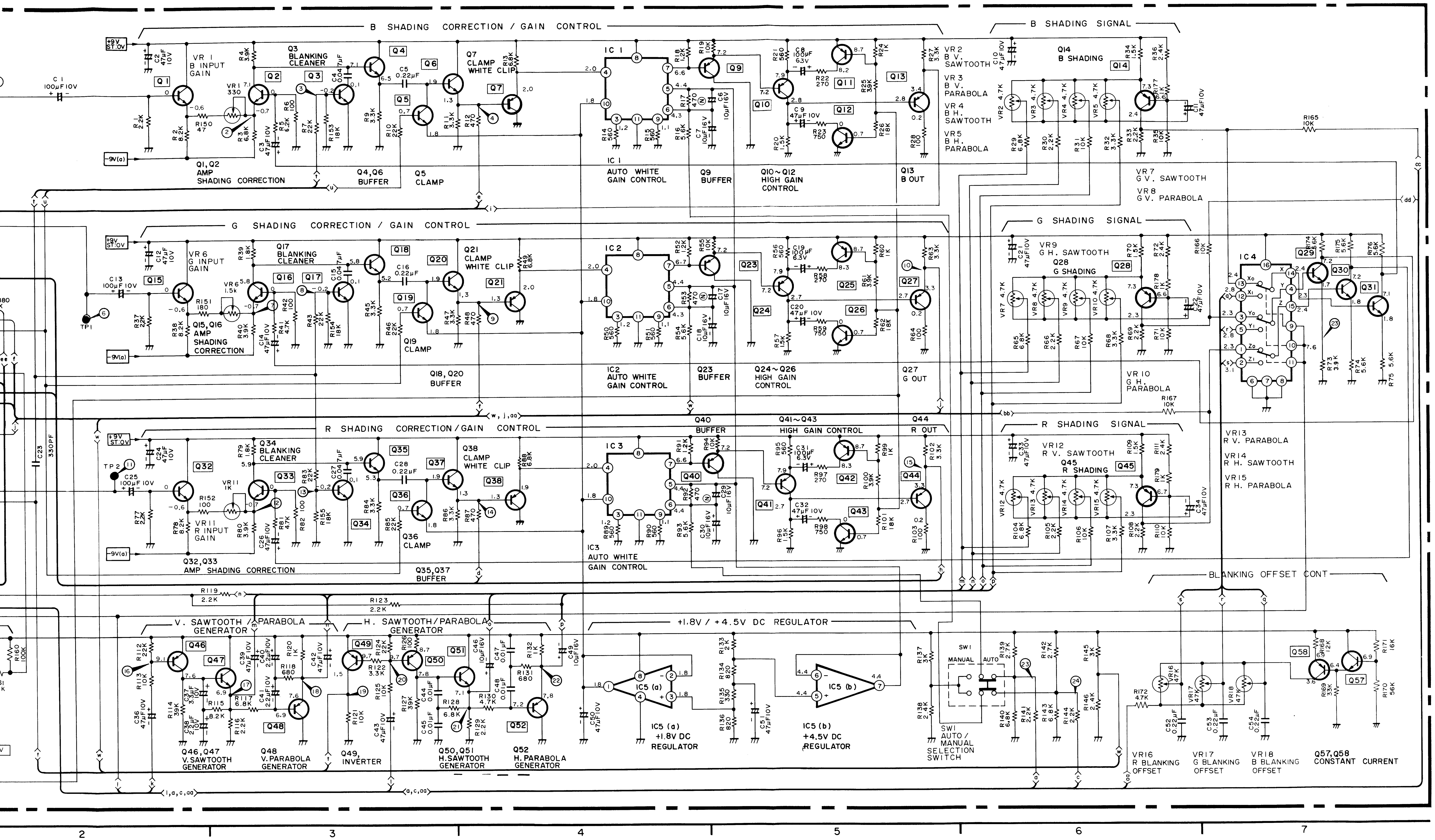
SCHEMATIC DIAGRAM OF PROCESS-1 BOARD

Process-1 Board

IC1	AN610P		C4
IC2	AN610P		B4, C4
IC3	AN610P		B4
IC4	TC4053BF		B7
IC5	NJM4558M		A4, A5
Q1	2SC2405STU	(S)	C2
Q2	2SC2404-CD	(U)	C3
Q3	2SC2404-CD	(U)	C3
Q4	2SC2405STU	(S)	C3
Q5	2SC2404-CD	(U)	C3
Q6	2SC2405STU	(S)	C3
Q7	2SB709-QRS	(A)	C4
Q9	2SA1034-ST	(F)	C5
Q10	2SA1022-CD	(E)	C5
Q11	2SB709-QRS	(A)	C5
Q12	2SD601-QRS	(Y)	C5
Q13	2SS1034-ST	(F)	C5
Q14	2SB709-QRS	(A)	C6
Q15	2SC2405STU	(S)	B2
Q16	2SC2404-CD	(U)	B3
Q17	2SC2404-CD	(U)	B3
Q18	2SC2405STU	(S)	B3
Q19	2SC2404-CD	(U)	B3
Q20	2SC2405STU	(S)	B3
Q21	2SB709-QRS	(A)	B4
Q23	2SA1034-ST	(F)	B5
Q24	2SA1022-CD	(E)	B5
Q25	2SB709-QRS	(A)	B5
Q26	2SD601-QRS	(Y)	B5
Q27	2SA1034-ST	(F)	B5
Q28	2SB709-QRS	(A)	B6
Q29	2SD601-QRS	(Y)	B7
Q30	2SD601-QRS	(Y)	B7
Q31	2SD601-QRS	(Y)	B7
Q32	2SC2405STU	(S)	B2
Q33	2SC2404-CD	(U)	B3
Q34	2SC2404-CD	(U)	B3
Q35	2SC2405STU	(S)	B3
Q36	2SC2404-D	(U)	B3
Q37	2SC2405STU	(S)	B3
Q38	2SB709-QRS	(A)	B4
Q40	2SA1034-ST	(F)	B5
Q41	2SA1022-CD	(E)	B5
Q42	2SB709-QRS	(A)	B5
Q43	2SD601-QRS	(Y)	B5
Q44	2SA1034-ST	(F)	B5
Q45	2SB709-QRS	(A)	B6
Q46	2SB709-QRS	(A)	A2
Q47	2SD601-QRS	(Y)	A3
Q48	2SB709-QRS	(A)	A3
Q49	2SB709-QRS	(A)	A3
Q50	2SB709-QRS	(A)	A3
Q51	2SD601-QRS	(Y)	A4
Q52	2SB709-QRS	(A)	A4
Q53	2SK198-Q	(1O)	A1
Q54	2SK198-Q	(1O)	A1
Q55	2SB709-QRS	(A)	A1
Q56	2SD601-QRS	(Y)	A1
Q57	2SD601-QRS	(Y)	A7
Q58	2SB709-QRS	(A)	A7


C
B
A
1
2
3
4
5
TO MOTHER BOARD ----CN1
CN 1
GND
B IN
GND
G IN
R GAIN CONTROL IN
R IN
B GAIN CONTROL IN
PED THERMAL CORRECT IN
R(FBC) OUT
NOT USED
B(FBC) OUT
AUTOMATIC GAIN CONTROL OUT
G(FBC) OUT
CP IN
+9V IN (STANDBY: 0V)
+9V IN (STANDBY: 0V)
CORNER GATE PULSE OUT
BLANKING OFFSET BUSY IN
HIGH GAIN CONTROL IN
R OUT
R BLANKING OFFSET IN
B OUT
B BLANKING OFFSET IN
G OUT
G BLANKING OFFSET IN
Hs PULSE OUT
-9V IN
Vs IN
Hs IN
GND
GND
B SHADING CORRECTION / GAIN CONTROL
G SHADING CORRECTION / GAIN CONTROL
R SHADING CORRECTION / GAIN CONTROL
TP3
TP1
TP2
+9V ST:0V
-9V(a)
VR1 B INPUT GAIN
VR6 G INPUT GAIN
VR11 R INPUT GAIN
Q3 BLANKING CLEANER
Q17 BLANKING CLEANER
Q34 BLANKING CLEANER
Q7 CLAMP WHITE CLIP
Q21 CLAMP WHITE CLIP
Q38 CLAMP WHITE CLIP
Q1, Q2 AMP SHADING CORRECTION
Q4, Q6 BUFFER
Q5 CLAMP
IC1 AUTO WHITE GAIN CONTROL
Q9 BUFFER
Q10~Q12 HIGH GAIN CONTROL
Q15, Q16 AMP SHADING CORRECTION
Q19 CLAMP
Q18, Q20 BUFFER
IC2 AUTO WHITE GAIN CONTROL
Q23 BUFFER
Q24~Q26 HIGH GAIN CONTROL
Q32, Q33 AMP SHADING CORRECTION
Q36 CLAMP
Q35, Q37 BUFFER
IC3 AUTO WHITE GAIN CONTROL
Q40 BUFFER
Q41~Q43 HIGH GAIN CONTROL
HIGH GAIN CONT SELECT
Q53~Q56 HIGH GAIN SWITCHING
V. SAWTOOTH / PARABOLA GENERATOR
H. SAWTOOTH / PARABOLA GENERATOR
Q46, Q47 V. SAWTOOTH GENERATOR
Q48 V. PARABOLA GENERATOR
Q49, INVERTER
Q50, Q51 H. SAWTOOTH GENERATOR
Q52 H. PARABOLA GENERATOR
+1.8V / +4.5V DC REGULATOR
IC5 (a) +1.8V DC REGULATOR
IC5 (b) +4.5V DC REGULATOR
-9V

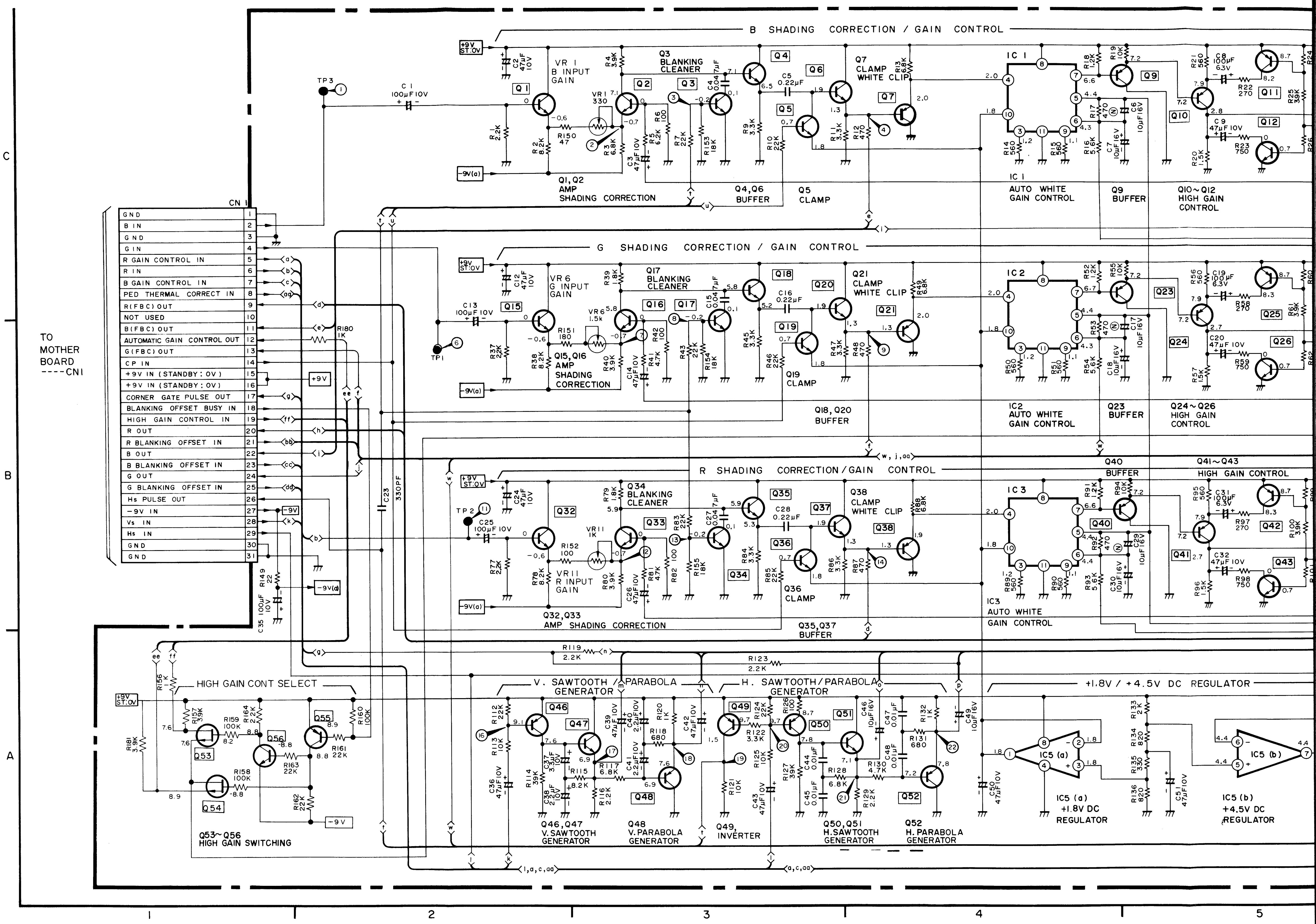
SCHEMATIC DIAGRAM OF PROCESS-1 BOARD


B SHADING CORRECTION / GAIN CONTROL
B SHADING SIGNAL
G SHADING CORRECTION / GAIN CONTROL
G SHADING SIGNAL
R SHADING CORRECTION/GAIN CONTROL
R SHADING SIGNAL
BLANKING OFFSET CONT
V. SAWTOOTH / PARABOLA GENERATOR
H. SAWTOOTH/PARABOLA GENERATOR
+1.8V / +4.5V DC REGULATOR
VR 1 B INPUT GAIN
Q1, Q2 AMP SHADING CORRECTION
Q3 BLANKING CLEANER
Q4, Q6 BUFFER
Q5 CLAMP
Q7 CLAMP WHITE CLIP
IC 1 AUTO WHITE GAIN CONTROL
Q9 BUFFER
Q10~Q12 HIGH GAIN CONTROL
Q13 B OUT
VR2 B V. SAWTOOTH
VR3 B V. PARABOLA
VR4 B H. SAWTOOTH
VR5 B H. PARABOLA
Q14 B SHADING
VR7 G V. SAWTOOTH
VR8 G V. PARABOLA
VR 6 G INPUT GAIN
Q15, Q16 AMP SHADING CORRECTION
Q17 BLANKING CLEANER
Q18, Q20 BUFFER
Q19 CLAMP
Q21 CLAMP WHITE CLIP
IC2 AUTO WHITE GAIN CONTROL
Q23 BUFFER
Q24~Q26 HIGH GAIN CONTROL
Q27 G OUT
VR9 G H. SAWTOOTH
Q28 G SHADING
VR 10 G H. PARABOLA
IC4
Q29
Q30
Q31
VR11 R INPUT GAIN
Q32, Q33 AMP SHADING CORRECTION
Q34 BLANKING CLEANER
Q35, Q37 BUFFER
Q36 CLAMP
Q38 CLAMP WHITE CLIP
IC3 AUTO WHITE GAIN CONTROL
Q40 BUFFER
Q41~Q43 HIGH GAIN CONTROL
Q44 R OUT
VR12 R V. SAWTOOTH
Q45 R SHADING
VR13 R V. PARABOLA
VR14 R H. SAWTOOTH
VR15 R H. PARABOLA
Q46, Q47 V. SAWTOOTH GENERATOR
Q48 V. PARABOLA GENERATOR
Q49, INVERTER
Q50, Q51 H. SAWTOOTH GENERATOR
Q52 H. PARABOLA GENERATOR
IC5 (a) +1.8V DC REGULATOR
IC5 (b) +4.5V DC REGULATOR
SW1 MANUAL AUTO
SW1 AUTO / MANUAL SELECTION SWITCH
VR16 R BLANKING OFFSET
VR17 G BLANKING OFFSET
VR18 B BLANKING OFFSET
Q57, Q58 CONSTANT CURRENT
+9V ST.0V
-9V(a)
TP1
TP2
2
3
4
5
6
7

SCHEMATIC DIAGRAM OF PROCESS-1 BOARD

Process-1 Board

IC1	AN610P		C4
IC2	AN610P		B4, C4
IC3	AN610P		B4
IC4	TC4053BF		B7
IC5	NJM4558M		A4, A5
Q1	2SC2405STU	(S)	C2
Q2	2SC2404-CD	(U)	C3
Q3	2SC2404-CD	(U)	C3
Q4	2SC2405STU	(S)	C3
Q5	2SC2404-CD	(U)	C3
Q6	2SC2405STU	(S)	C3
Q7	2SB709-QRS	(A)	C4
Q9	2SA1034-ST	(F)	C5
Q10	2SA1022-CD	(E)	C5
Q11	2SB709-QRS	(A)	C5
Q12	2SD601-QRS	(Y)	C5
Q13	2SS1034-ST	(F)	C5
Q14	2SB709-QRS	(A)	C6
Q15	2SC2405STU	(S)	B2
Q16	2SC2404-CD	(U)	B3
Q17	2SC2404-CD	(U)	B3
Q18	2SC2405STU	(S)	B3
Q19	2SC2404-CD	(U)	B3
Q20	2SC2405STU	(S)	B3
Q21	2SB709-QRS	(A)	B4
Q23	2SA1034-ST	(F)	B5
Q24	2SA1022-CD	(E)	B5
Q25	2SB709-QRS	(A)	B5
Q26	2SD601-QRS	(Y)	B5
Q27	2SA1034-ST	(F)	B5
Q28	2SB709-QRS	(A)	B6
Q29	2SD601-QRS	(Y)	B7
Q30	2SD601-QRS	(Y)	B7
Q31	2SD601-QRS	(Y)	B7
Q32	2SC2405STU	(S)	B2
Q33	2SC2404-CD	(U)	B3
Q34	2SC2404-CD	(U)	B3
Q35	2SC2405STU	(S)	B3
Q36	2SC2404-D	(U)	B3
Q37	2SC2405STU	(S)	B3
Q38	2SB709-QRS	(A)	B4
Q40	2SA1034-ST	(F)	B5
Q41	2SA1022-CD	(E)	B5
Q42	2SB709-QRS	(A)	B5
Q43	2SD601-QRS	(Y)	B5
Q44	2SA1034-ST	(F)	B5
Q45	2SB709-QRS	(A)	B6
Q46	2SB709-QRS	(A)	A2
Q47	2SD601-QRS	(Y)	A3
Q48	2SB709-QRS	(A)	A3
Q49	2SB709-QRS	(A)	A3
Q50	2SB709-QRS	(A)	A3
Q51	2SD601-QRS	(Y)	A4
Q52	2SB709-QRS	(A)	A4
Q53	2SK198-Q	(1O)	A1
Q54	2SK198-Q	(1O)	A1
Q55	2SB709-QRS	(A)	A1
Q56	2SD601-QRS	(Y)	A1
Q57	2SD601-QRS	(Y)	A7
Q58	2SB709-QRS	(A)	A7



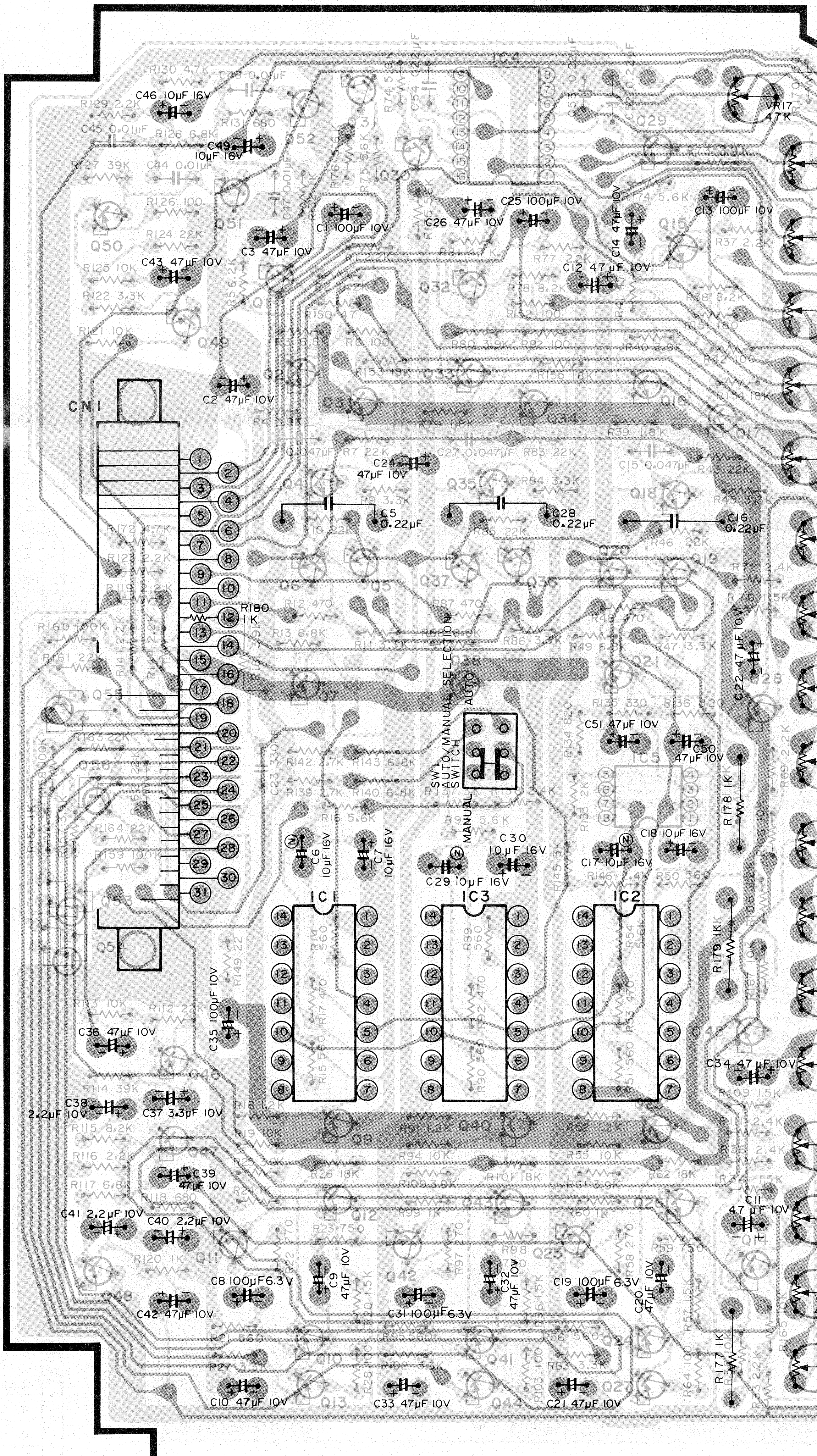
C
B
A
1
2
3
4
5
TO MOTHER BOARD ----CN1
CN 1
1 GND
2 B IN
3 GND
4 G IN
5 R GAIN CONTROL IN
6 R IN
7 B GAIN CONTROL IN
8 PED THERMAL CORRECT IN
9 R(FBC) OUT
10 NOT USED
11 B(FBC) OUT
12 AUTOMATIC GAIN CONTROL OUT
13 G(FBC) OUT
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 CORNER GATE PULSE OUT
18 BLANKING OFFSET BUSY IN
19 HIGH GAIN CONTROL IN
20 R OUT
21 R BLANKING OFFSET IN
22 B OUT
23 B BLANKING OFFSET IN
24 G OUT
25 G BLANKING OFFSET IN
26 Hs PULSE OUT
27 -9V IN
28 Vs IN
29 Hs IN
30 GND
31 GND
TP3
TP1
TP2
B SHADING CORRECTION / GAIN CONTROL
VR 1 B INPUT GAIN
Q1, Q2 AMP SHADING CORRECTION
Q3 BLANKING CLEANER
Q4, Q6 BUFFER
Q5 CLAMP
Q7 CLAMP WHITE CLIP
IC 1 AUTO WHITE GAIN CONTROL
Q9 BUFFER
Q10~Q12 HIGH GAIN CONTROL
G SHADING CORRECTION / GAIN CONTROL
VR6 G INPUT GAIN
Q15, Q16 AMP SHADING CORRECTION
Q17 BLANKING CLEANER
Q18, Q20 BUFFER
Q19 CLAMP
Q21 CLAMP WHITE CLIP
IC2 AUTO WHITE GAIN CONTROL
Q23 BUFFER
Q24~Q26 HIGH GAIN CONTROL
R SHADING CORRECTION/GAIN CONTROL
VR11 R INPUT GAIN
Q32, Q33 AMP SHADING CORRECTION
Q34 BLANKING CLEANER
Q35, Q37 BUFFER
Q36 CLAMP
Q38 CLAMP WHITE CLIP
IC3 AUTO WHITE GAIN CONTROL
Q40 BUFFER
Q41~Q43 HIGH GAIN CONTROL
HIGH GAIN CONT SELECT
Q53~Q56 HIGH GAIN SWITCHING
V. SAWTOOTH / PARABOLA GENERATOR
Q46, Q47 V. SAWTOOTH GENERATOR
Q48 V. PARABOLA GENERATOR
Q49 INVERTER
H. SAWTOOTH/PARABOLA GENERATOR
Q50, Q51 H. SAWTOOTH GENERATOR
Q52 H. PARABOLA GENERATOR
+1.8V / +4.5V DC REGULATOR
IC5 (a) +1.8V DC REGULATOR
IC5 (b) +4.5V DC REGULATOR
+9V ST:OV
-9V(a)

CONDUCTOR VIEW OF PROCESS-1 BOARD

CN1

GND	1
B IN	2
GND	3
G IN	4
R GAIN CONTROL IN	5
R IN	6
B GAIN CONTROL IN	7
PED THERMAL CORRECT IN	8
R (FBC) OUT	9
NOT USED	10
B (FBC) OUT	11
AUTOMATIC GAIN CONTROL OUT	12
G (FBC) OUT	13
CP IN	14
+9V IN (STANDBY : 0V)	15
+9V IN (STANDBY : 0V)	16
CORNER GATE PULSE OUT	17
BLANKING OFFSET BUSY IN	18
HIGH GAIN CONTROL IN	19
R OUT	20
R BLANKING OFFSET IN	21
B OUT	22
B BLANKING OFFSET IN	23
G OUT	24
G BLANKING OFFSET IN	25
Hs PULSE OUT	26
−9V IN	27
Vs IN	28
Hs IN	29
GND	30
GND	31

TO
MOTHER BOARD
···CN1


CN1
IC1
IC2
IC3
IC4
IC5
SW1 AUTO/MANUAL SWITCH
AUTO
MANUAL
MANUAL SELECTION
VR17 47K
R130 4.7K
C46 10µF 16V
C48 0.01µF
R129 2.2K
R131 680
C45 0.01µF
R128 6.8K
C49 10µF 16V
R127 39K
C44 0.01µF
Q52
Q31
Q30
Q29
Q50
Q51
R126 100
R124 22K
C43 47µF 10V
C3 47µF 10V
C1 100µF 10V
C26 47µF 10V
C25 100µF 10V
C14 47µF 10V
R174 5.6K
C13 100µF 10V
Q15
R37 2.2K
R125 10K
R122 3.3K
Q1
Q32
C12 47µF 10V
R77 22K
R78 8.2K
R38 8.2K
R121 10K
Q49
R150 47
R152 100
R151 100
C2 47µF 10V
Q2
R6 100
R80 3.9K
R82 100
R40 3.9K
R42 100
R153 18K
Q33
R155 18K
R154 18K
Q3
Q34
Q16
Q17
R4 3.9K
R79 1.8K
R39 1.8K
C4 0.047µF
R7 22K
C24 47µF 10V
C27 0.047µF
R83 22K
C15 0.047µF
R43 22K
Q4
Q35
R84 3.3K
Q18
R45 3.3K
C5 0.22µF
C28 0.22µF
C16 0.22µF
R9 3.3K
R10 22K
R85 22K
R46 22K
R172 4.7K
R123 2.2K
R119 2.2K
Q20
Q19
R72 2.4K
Q6
Q5
Q37
Q36
R70 1.5K
R160 100K
R180 1K
R12 470
R87 470
R48 470
R161 22K
R13 6.8K
R11 3.3K
R86 3.3K
R49 6.8K
R47 3.3K
C22 47µF 10V
Q55
Q7
Q38
Q21
Q28
R135 330
R136 820
R163 22K
C51 47µF 10V
C50 47µF 10V
Q56
C23 330pF
R142 2.7K
R143 6.8K
R139 2.7K
R140 6.8K
R134 820
R178 1K
R164 22K
R159 100K
R15 5.6K
R93 5.6K
C6 10µF 16V
C7 10µF 16V
C30 10µF 16V
C29 10µF 16V
C18 10µF 16V
C17 10µF 16V
R146 2.4K
R50 560
Q53
Q54
R149 22
R179 1K
R14 560
R17 470
R15 560
R89 560
R92 470
R90 560
R54 5.6K
R53 470
R51 560
R113 10K
R112 22K
C35 100µF 10V
C36 47µF 10V
Q46
Q45
C34 47µF 10V
R114 39K
C38 2.2µF 10V
C37 3.3µF 10V
R18 1.2K
Q9
R91 1.2K
Q40
R52 1.2K
R109 1.5K
R115 8.2K
R19 10K
R94 10K
R55 10K
R116 2.2K
Q47
R25 3.9K
R26 18K
R100 3.9K
R101 18K
R61 3.9K
R62 18K
R117 6.8K
C39 47µF 10V
R118 680
R24 1K
Q12
R99 1K
Q43
R60 1K
Q26
C11 47µF 10V
C41 2.2µF 10V
C40 2.2µF 10V
R23 750
R98
Q25
R59 750
R120 1K
Q11
C8 100µF 6.3V
C9 47µF 10V
Q42
C32 47µF 10V
C19 100µF 6.3V
C20 47µF 10V
Q48
C42 47µF 10V
C31 100µF 6.3V
R21 560
R95 560
R56 560
Q24
R27 3.3K
Q10
R102 3.3K
Q41
R63 3.3K
Q27
R177 1K
C10 47µF 10V
Q13
C33 47µF 10V
Q44
C21 47µF 10V

D

C

B

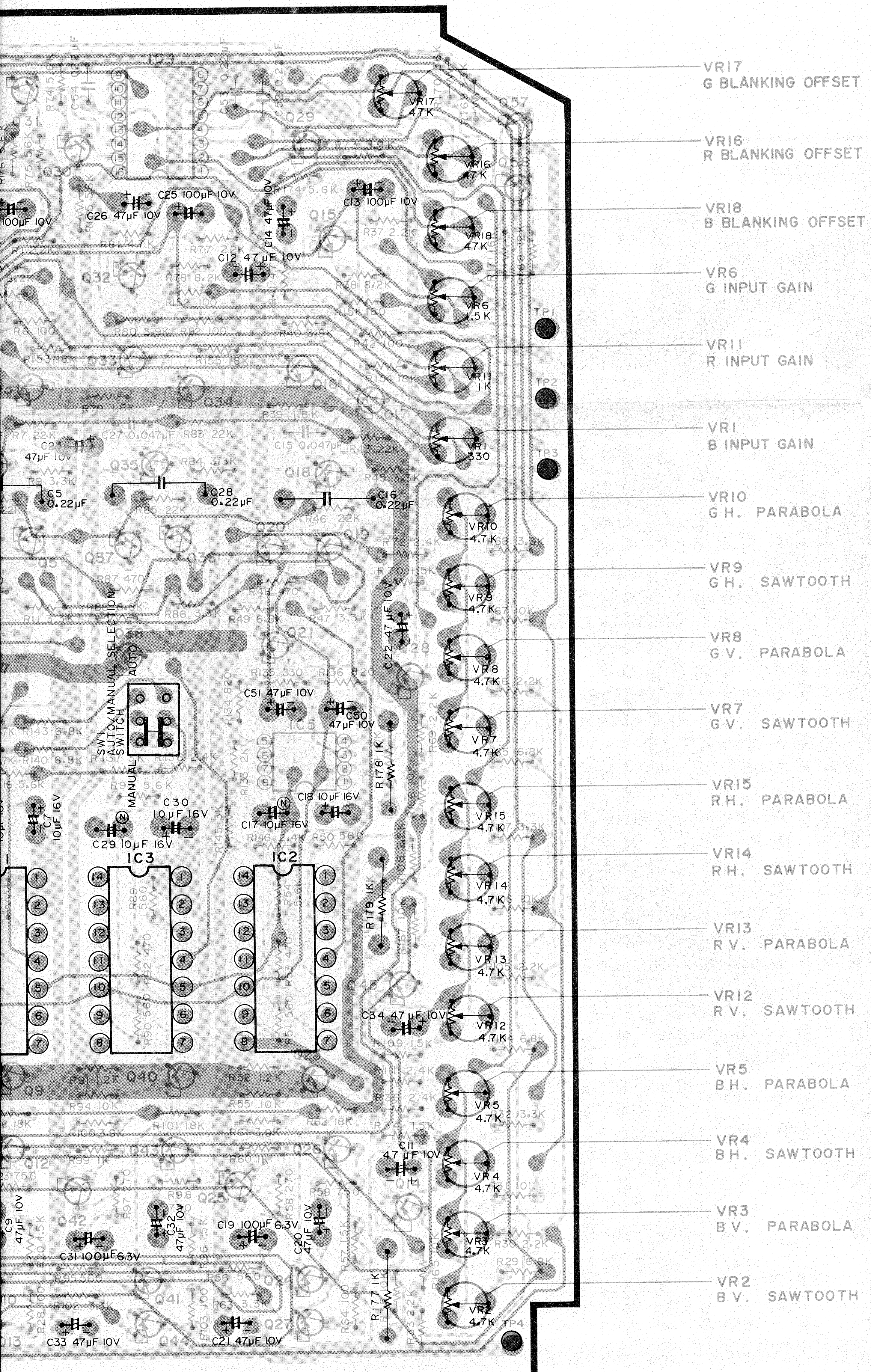
A

1

2

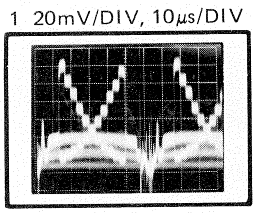
3

ESS-1 BOARD

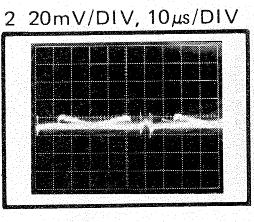

VR17
G BLANKING OFFSET
VR16
R BLANKING OFFSET
VR18
B BLANKING OFFSET
VR6
G INPUT GAIN
VR11
R INPUT GAIN
VR1
B INPUT GAIN
VR10
GH. PARABOLA
VR9
GH. SAWTOOTH
VR8
GV. PARABOLA
VR7
GV. SAWTOOTH
VR15
RH. PARABOLA
VR14
RH. SAWTOOTH
VR13
RV. PARABOLA
VR12
RV. SAWTOOTH
VR5
BH. PARABOLA
VR4
BH. SAWTOOTH
VR3
BV. PARABOLA
VR2
BV. SAWTOOTH
TP1
TP2
TP3
TP4
IC2
IC3
IC4
IC5
SW1 AUTO/MANUAL SWITCH
MANUAL SELECTION
AUTO
MANUAL
3
4

SIGNAL WAVEFORMS OF PR

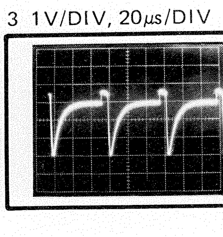
1 20mV/DIV, 10µs/DIV



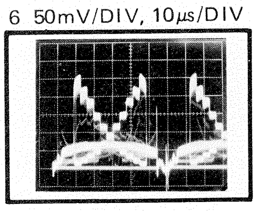
2 20mV/DIV, 10µs/DIV



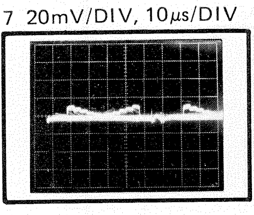
3 1V/DIV, 20µs/DIV



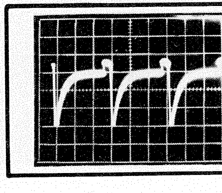
6 50mV/DIV, 10µs/DIV



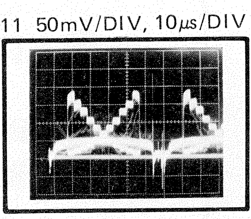
7 20mV/DIV, 10µs/DIV



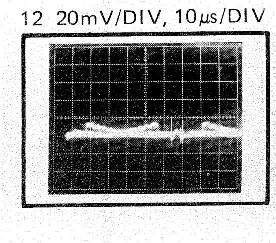
8 1V/DIV, 20µs/DIV



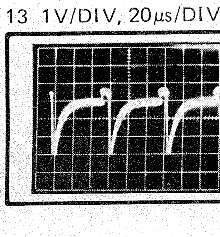
11 50mV/DIV, 10µs/DIV



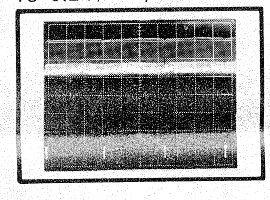
12 20mV/DIV, 10µs/DIV



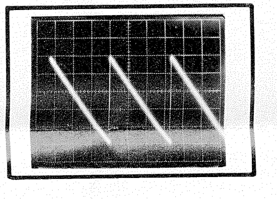
13 1V/DIV, 20µs/DIV



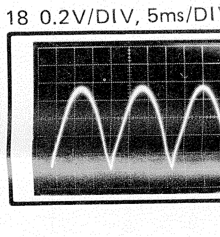
16 0.2V/DIV, 5ms/DIV



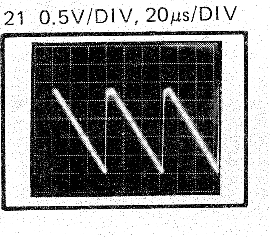
17 0.5V/DIV, 5ms/DIV



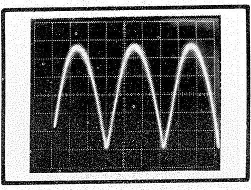
18 0.2V/DIV, 5ms/DIV



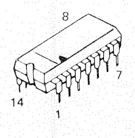
21 0.5V/DIV, 20µs/DIV



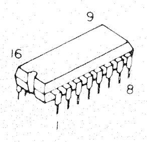
22 0.2V/DIV, 20µs/DIV



AN610P



TC4053BF



Process-1 Board

IC1	AN610P		B3
IC2	AN610P		B3
IC3	AN610P		B3
IC4	TC4053BF		D3
IC5	NJM4558M		B3
Q1	2SC2405STU	(S)	D3
Q2	2SC2404-CD	(U)	C3
Q3	2SC2404-CD	(U)	C3
Q4	2SC2405STU	(S)	C3
Q5	2SC2404-CD	(U)	C3
Q6	2SC2405STU	(S)	C3
Q7	2SB709-QRS	(A)	C3
Q9	2SA1034-ST	(F)	A3
Q10	2SA1022-CD	(E)	A3
Q11	2SB709-QRS	(A)	A2
Q12	2SD601-QRS	(Y)	A3
Q13	2SS1034-ST	(F)	A3
Q14	2SB709-QRS	(A)	A4
Q15	2SC2405STU	(S)	D3, D4
Q16	2SC2404-CD	(U)	C3
Q17	2SC2404-CD	(U)	C4
Q18	2SC2405STU	(S)	C3, C4
Q19	2SC2404-CD	(U)	C3, C4
Q20	2SC2405STU	(S)	C3
Q21	2SB709-QRS	(A)	C3
Q23	2SA1034-ST	(F)	A3
Q24	2SA1022-CD	(E)	A3
Q25	2SB709-QRS	(A)	A3
Q26	2SD601-QRS	(Y)	A3
Q27	2SA1034-ST	(F)	A3

Q28	2SB709
Q29	2SD60
Q30	2SD60
Q31	2SD60
Q32	2SC240
Q33	2SC240
Q34	2SC240
Q35	2SC240
Q36	2SC240
Q37	2SC240
Q38	2SB709
Q40	2SA10
Q41	2SA10
Q42	2SB709
Q43	2SD60
Q44	2SA10
Q45	2SB709
Q46	2SB709
Q47	2SD60
Q48	2SD70
Q49	2SB70
Q50	2SB70
Q51	2SB70
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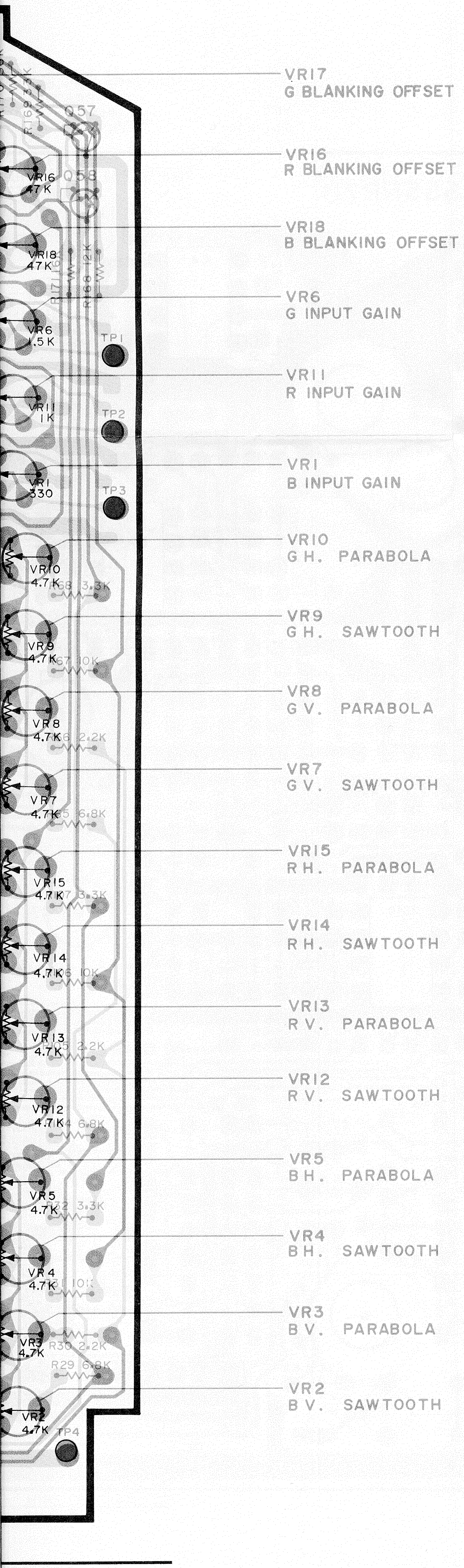
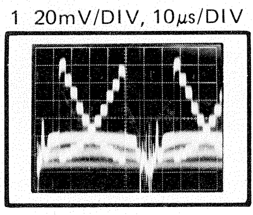
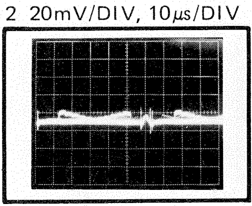
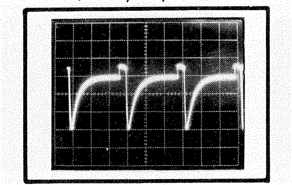
Q53	2SK19
Q54	2SK19
Q55	2SB70
Q56	2SD60
Q57	2SD60
Q58	2SB70

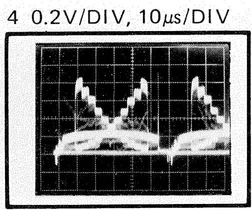

VR17
G BLANKING OFFSET
VR16
R BLANKING OFFSET
VR18
B BLANKING OFFSET
VR6
G INPUT GAIN
VR11
R INPUT GAIN
VR1
B INPUT GAIN
VR10
G H. PARABOLA
VR9
G H. SAWTOOTH
VR8
G V. PARABOLA
VR7
G V. SAWTOOTH
VR15
R H. PARABOLA
VR14
R H. SAWTOOTH
VR13
R V. PARABOLA
VR12
R V. SAWTOOTH
VR5
B H. PARABOLA
VR4
B H. SAWTOOTH
VR3
B V. PARABOLA
VR2
B V. SAWTOOTH
Q57
Q58
R169
R171
R168 12K
VR16 47K
VR18 47K
VR6 1.5K
VR11 1K
VR1 330
VR10 4.7K
VR9 4.7K
VR8 4.7K
VR7 4.7K
VR15 4.7K
VR14 4.7K
VR13 4.7K
VR12 4.7K
VR5 4.7K
VR4 4.7K
VR3 4.7K
VR2 4.7K
3.3K
10K
2.2K
6.8K
R30 2.2K
R29 6.8K
TP1
TP2
TP3
TP4

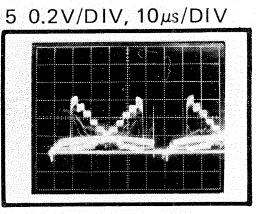
SIGNAL WAVEFORMS OF PROCESS-1 BOARD

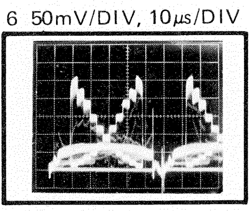

1 20mV/DIV, 10µs/DIV

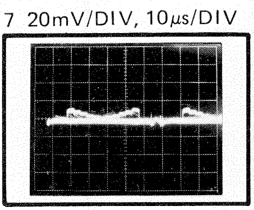

2 20mV/DIV, 10µs/DIV

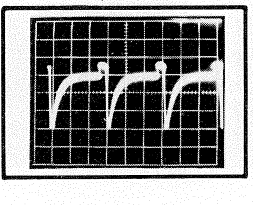

3 1V/DIV, 20µs/DIV

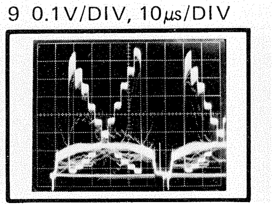

4 0.2V/DIV, 10µs/DIV

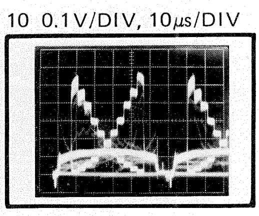

5 0.2V/DIV, 10µs/DIV

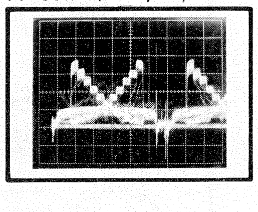

6 50mV/DIV, 10µs/DIV

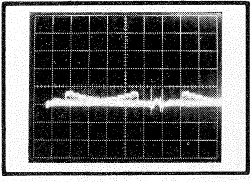

7 20mV/DIV, 10µs/DIV

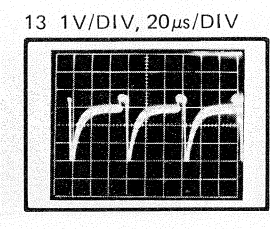

8 1V/DIV, 20µs/DIV

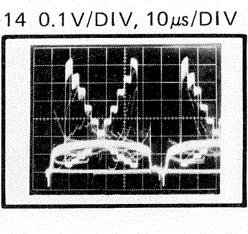

9 0.1V/DIV, 10µs/DIV

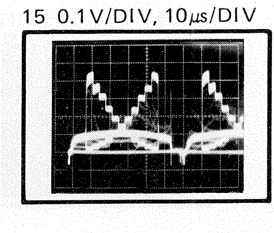

10 0.1V/DIV, 10µs/DIV

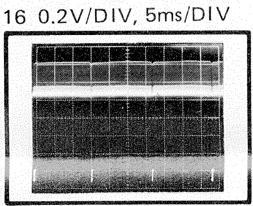

11 50mV/DIV, 10µs/DIV

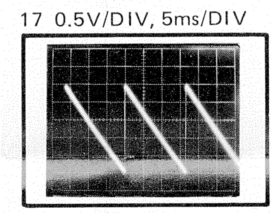

12 20mV/DIV, 10µs/DIV

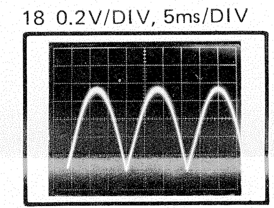

13 1V/DIV, 20µs/DIV

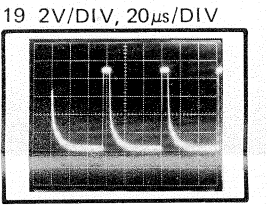

14 0.1V/DIV, 10µs/DIV

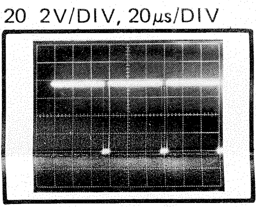

15 0.1V/DIV, 10µs/DIV

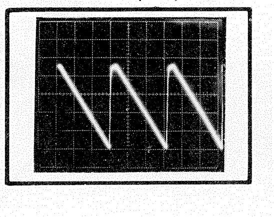

16 0.2V/DIV, 5ms/DIV

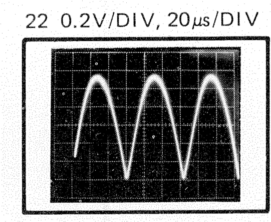

17 0.5V/DIV, 5ms/DIV


18 0.2V/DIV, 5ms/DIV

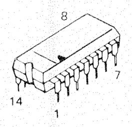

19 2V/DIV, 20µs/DIV


20 2V/DIV, 20µs/DIV

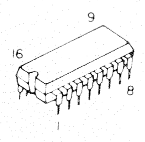

21 0.5V/DIV, 20µs/DIV


22 0.2V/DIV, 20µs/DIV

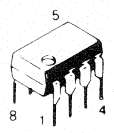
AN610P



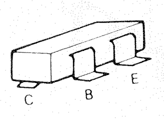
TC4053BF



NJM4558M



2SA1022-CD
2SA1034-ST
2SB709-QRS
2SC2404-CD
2SC2405-STU
2SD601-QRS

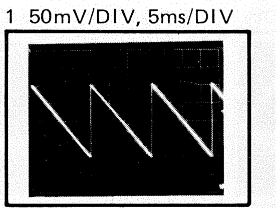


Process-1 Board

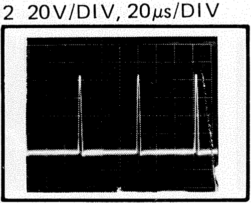
IC1	AN610P		B3
IC2	AN610P		B3
IC3	AN610P		B3
IC4	TC4053BF		D3
IC5	NJM4558M		B3
Q1	2SC2405STU	(S)	D3
Q2	2SC2404-CD	(U)	C3
Q3	2SC2404-CD	(U)	C3
Q4	2SC2405STU	(S)	C3
Q5	2SC2404-CD	(U)	C3
Q6	2SC2405STU	(S)	C3
Q7	2SB709-QRS	(A)	C3
Q9	2SA1034-ST	(F)	A3
Q10	2SA1022-CD	(E)	A3
Q11	2SB709-QRS	(A)	A2
Q12	2SD601-QRS	(Y)	A3
Q13	2SS1034-ST	(F)	A3
Q14	2SB709-QRS	(A)	A4
Q15	2SC2405STU	(S)	D3, D4
Q16	2SC2404-CD	(U)	C3
Q17	2SC2404-CD	(U)	C4
Q18	2SC2405STU	(S)	C3, C4
Q19	2SC2404-CD	(U)	C3, C4
Q20	2SC2405STU	(S)	C3
Q21	2SB709-QRS	(A)	C3
Q23	2SA1034-ST	(F)	A3
Q24	2SA1022-CD	(E)	A3
Q25	2SB709-QRS	(A)	A3
Q26	2SD601-QRS	(Y)	A3
Q27	2SA1034-ST	(F)	A3
Q28	2SB709-QRS	(A)	B4
Q29	2SD601-QRS	(Y)	D3
Q30	2SD601-QRS	(Y)	D3
Q31	2SD601-QRS	(Y)	D3
Q32	2SC2405STU	(S)	D3
Q33	2SC2404-CD	(U)	C3
Q34	2SC2404-CD	(U)	C3
Q35	2SC2405STU	(S)	C3
Q36	2SC2404-D	(U)	C3
Q37	2SC2405STU	(S)	C3
Q38	2SB709-QRS	(A)	C3
Q40	2SA1034-ST	(F)	A3
Q41	2SA1022-CD	(E)	A3
Q42	2SB709-QRS	(A)	A3
Q43	2SD601-QRS	(Y)	A3
Q44	2SA1034-ST	(F)	A3
Q45	2SB709-QRS	(A)	B4
Q46	2SB709-QRS	(A)	B2
Q47	2SD601-QRS	(Y)	A2
Q48	2SD709-QRS	(A)	A2
Q49	2SB709-QRS	(A)	C2
Q50	2SB709-QRS	(A)	D2
Q51	2SB709-QRS	(Y)	D2
Q52	2SB709-QRS	(A)	D3
Q53	2SK198-Q	(1O)	B2
Q54	2SK198-Q	(1O)	B2
Q55	2SB709-QRS	(A)	B2
Q56	2SD601-QRS	(Y)	B2
Q57	2SD601-QRS	(Y)	D4
Q58	2SB709-QRS	(A)	D4

SIGNAL WAVEFORMS OF DEFLECTION BOARD

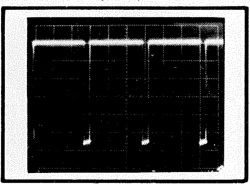
1 50mV/DIV, 5ms/DIV



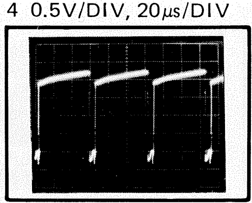
2 20V/DIV, 20μs/DIV



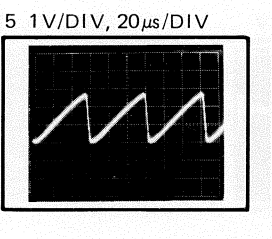
3 1V/DIV, 20μs/DIV



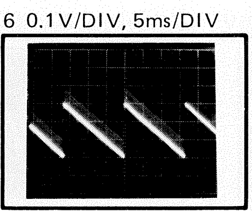
4 0.5V/DIV, 20μs/DIV



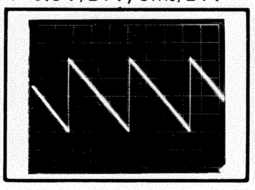
5 1V/DIV, 20μs/DIV



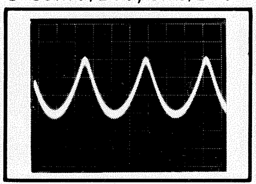
6 0.1V/DIV, 5ms/DIV



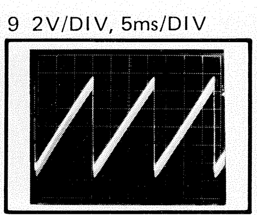
7 0.5V/DIV, 5ms/DIV



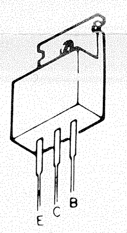
8 50mV/DIV, 5ms/DIV



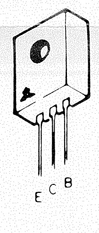
9 2V/DIV, 5ms/DIV



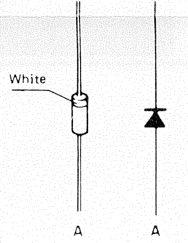
2SD959-PQ



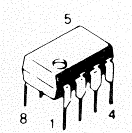
2SC1567-QR



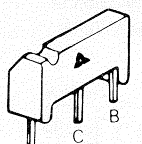
MA165



NJM4556D
NJM3415D

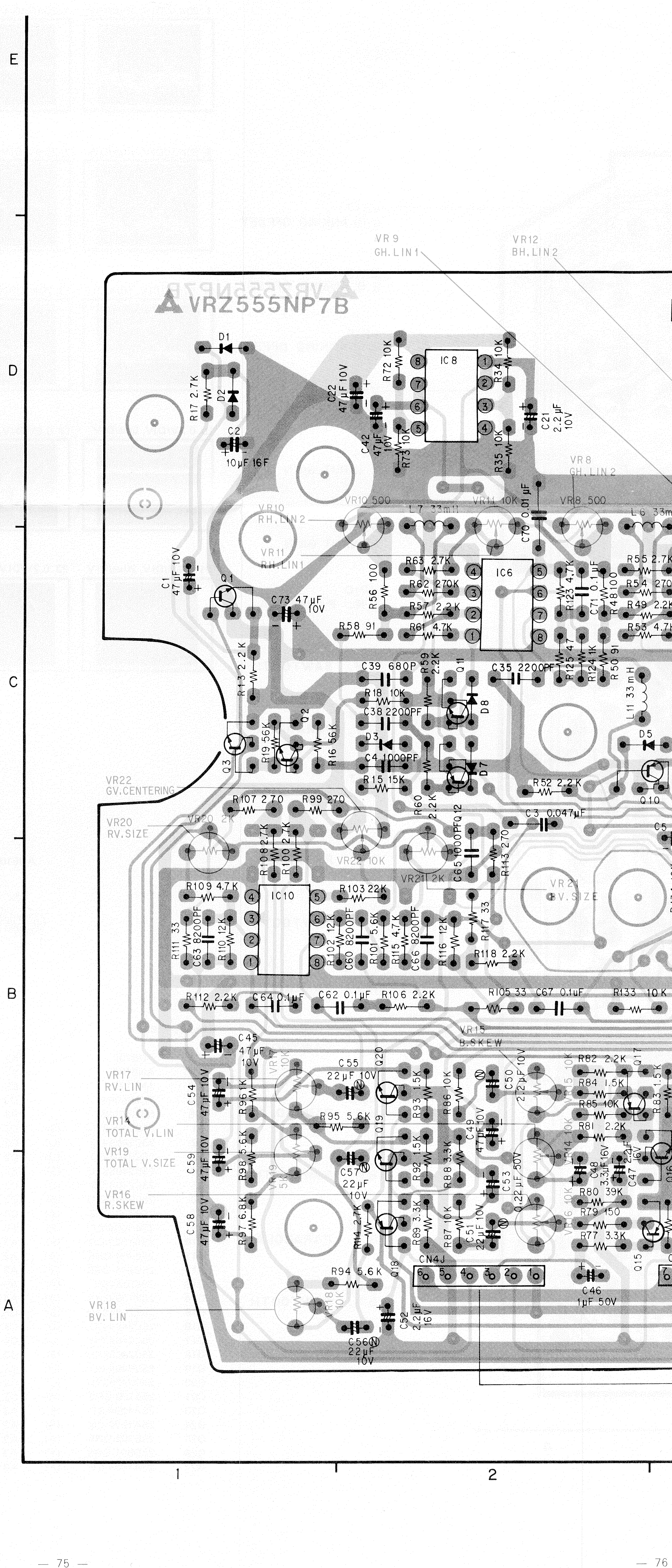


2SA564-RS
2SB641-RS
2SB643-RS
2SD636-RS
2SD638-QR
2SB788-RS

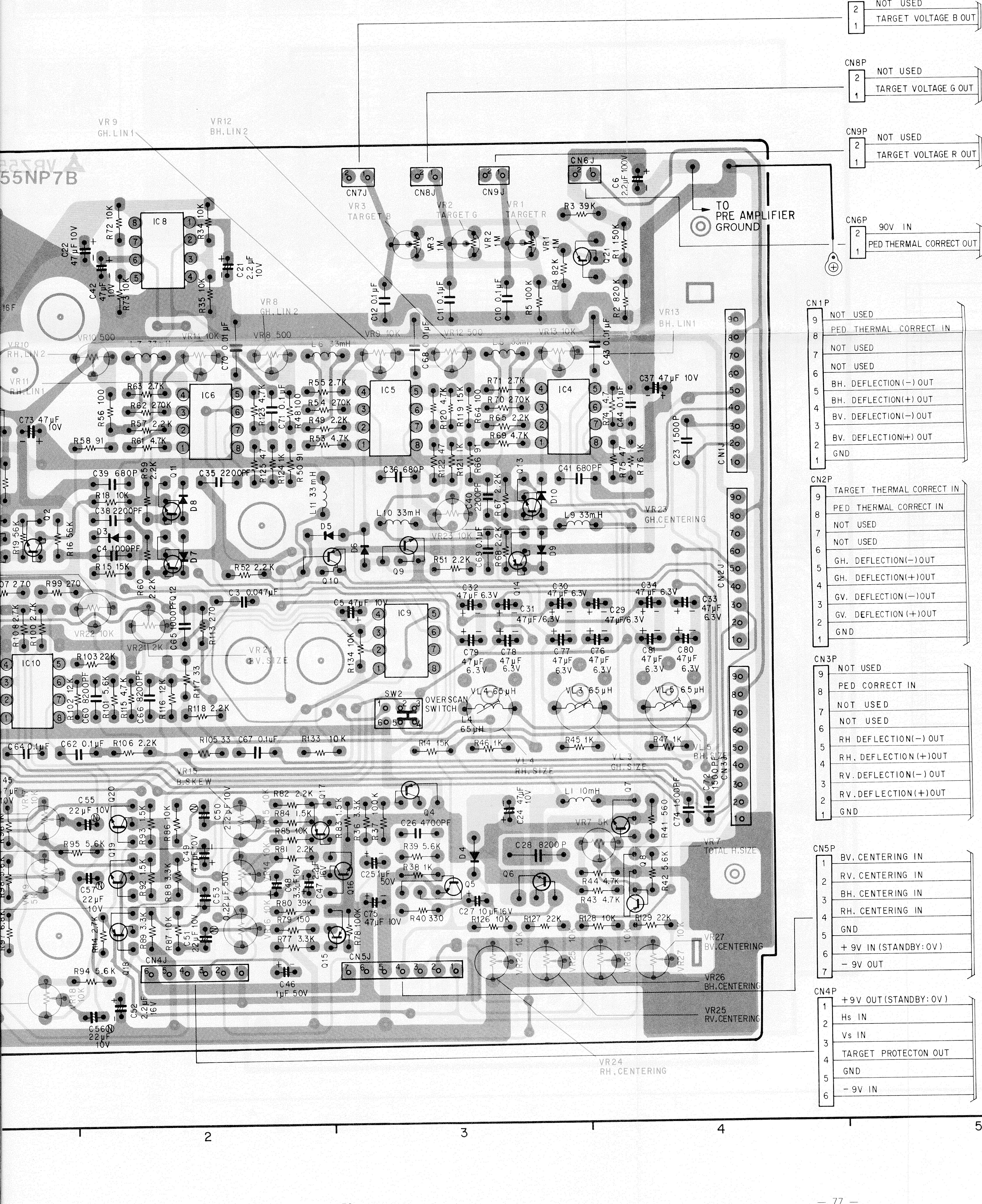


Deflection Board

IC4	NJM4556D	C3, C4
IC5	NJM4556D	C3
IC6	NJM4556D	C2
IC8	NJM4556D	D2
IC9	NJM3415D	B3
IC10	NJM3415D	B1
Q1	2SD636-RS	C1
Q2	2SD636-RS	C1
Q3	2SD636-RS	C1
Q4	2SB641-RS	B3
Q5	2SD638-QR	A3
Q6	2SD959-PQ	A3
Q7	2SC1567-QR	B4
Q8	2SA564-RS	A4, B4
Q9	2SD638-QR	C3
Q10	2SB643-RS	C2, C3
Q11	2SD638-QR	C2
Q12	2SB643-RS	C2
Q13	2SD638-QR	C3
Q14	2SD643-RS	C3
Q15	2SB641-RS	A3
Q16	2SD636-RS	A3, B3
Q17	2SB641-RS	B2
Q18	2SB641-RS	A2
Q19	2SD636-RS	A2, B2
Q20	2SD636-RS	B2
Q21	2SB788-RS	D4
D1	MA165	D1
D2	MA165	D1
D3	MA165	C2
D4	MA165	B3
D5	MA165	C2, C3
D6	MA165	C3
D7	MA165	C2
D8	MA165	C2
D9	MA165	C3
D10	MA165	C3

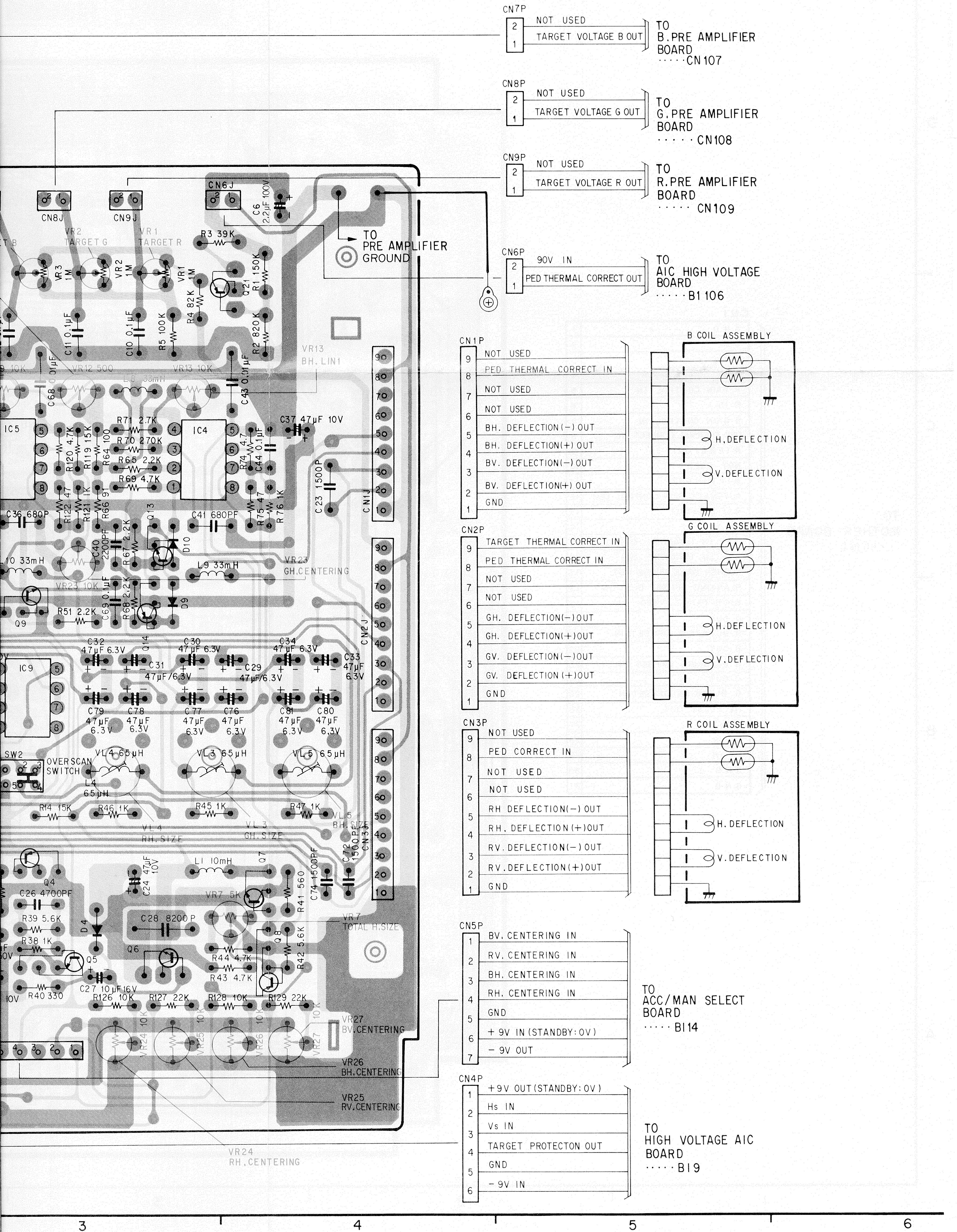

E
D
C
B
A
1
2
VRZ555NP7B
VR 9 GH. LIN 1
VR12 BH. LIN 2
VR 8 GH. LIN 2
VR10 RH. LIN 2
VR11 RH. LIN 1
VR10 500
VR11 10K
VR8 500
VR22 GV. CENTERING
VR20 RV. SIZE
VR20 2K
VR22 10K
VR21 2K
VR21 BV. SIZE
VR15 B. SKEW
VR17 RV. LIN
VR14 TOTAL V. LIN
VR19 TOTAL V. SIZE
VR16 R. SKEW
VR18 BV. LIN
IC 8
IC6
IC10
CN4J
D1
D2
D3
D5
D7
D8
Q1
Q2
Q3
Q10
Q11
Q12
Q15
Q17
Q18
Q19
Q20
R17 2.7K
R72 10K
R34 10K
R73 10K
R35 10K
C22 47μF 10V
C42 47μF 10V
C21 2.2μF 10V
C2 10μF 16F
C70 0.01 μF
L7 33mH
L6 33mH
L11 33 mH
C1 47μF 10V
C73 47μF 10V
R56 100
R63 2.7K
R62 270K
R57 2.2K
R58 91
R61 4.7K
R55 2.7K
R54 270
R49 2.2K
R53 4.7K
R123 4.7K
C71 0.1 μF
R48 100
R13 2.2K
C39 680P
R59 2.2K
C35 2200PF
R125 47
R124 1K
R50 91
R18 10K
C38 2200PF
R19 56K
R16 56K
C4 1000PF
R15 15K
R52 2.2K
R107 270
R99 270
R60 2.2K
C3 0.047μF
R108 2.7K
R100 2.7K
C65 1000PF
R113 270
R109 4.7K
R103 22K
R111 33
C63 8200PF
R110 12K
R102 12K
C60 8200PF
R101 5.6K
R115 4.7K
C66 8200PF
R116 12K
R117 33
R118 2.2K
R112 2.2K
C64 0.1μF
C62 0.1μF
R106 2.2K
R105 33
C67 0.1μF
R133 10K
C45 47μF 10V
C54 47μF 10V
R96 1K
C55 22μF 10V
R93 1.5K
R86 10K
C50 2.2μF 10V
R82 2.2K
R84 1.5K
R85 10K
R81 2.2K
R95 5.6K
C49 47μF 10V
C59 47μF 10V
R98 5.6K
C57 22μF 10V
R92 1.5K
R88 3.3K
C53 0.22μF 50V
C48 3.3μF 16V
C47 2.2μF 16V
R80 39K
R79 150
R77 3.3K
C58 47μF 10V
R97 6.8K
R114 2.7K
R89 3.3K
R87 10K
C51 22μF 10V
R94 5.6K
C46 1μF 50V
C52 2.2μF 16V
C56 22μF 10V

CONDUCTOR VIEW OF DEFLECTION BOARD



CN7P
2 NOT USED
1 TARGET VOLTAGE B OUT
CN8P
2 NOT USED
1 TARGET VOLTAGE G OUT
CN9P
2 NOT USED
1 TARGET VOLTAGE R OUT
CN6P
2 90V IN
1 PED THERMAL CORRECT OUT
TO PRE AMPLIFIER GROUND
CN1P
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 BH. DEFLECTION(−) OUT
4 BH. DEFLECTION(+) OUT
3 BV. DEFLECTION(−) OUT
2 BV. DEFLECTION(+) OUT
1 GND
CN2P
9 TARGET THERMAL CORRECT IN
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 GH. DEFLECTION(−)OUT
4 GH. DEFLECTION(+)OUT
3 GV. DEFLECTION(−)OUT
2 GV. DEFLECTION (+)OUT
1 GND
CN3P
9 NOT USED
8 PED CORRECT IN
7 NOT USED
6 NOT USED
5 RH DEFLECTION(−) OUT
4 RH. DEFLECTION (+)OUT
3 RV. DEFLECTION(−) OUT
2 RV. DEFLECTION(+)OUT
1 GND
CN5P
1 BV. CENTERING IN
2 RV. CENTERING IN
3 BH. CENTERING IN
4 RH. CENTERING IN
5 GND
6 + 9V IN (STANDBY: OV)
7 − 9V OUT
CN4P
1 +9V OUT (STANDBY: OV)
2 Hs IN
3 Vs IN
4 TARGET PROTECTON OUT
5 GND
6 − 9V IN
55NP7B
VR9 GH. LIN1
VR12 BH. LIN2
VR10 RH. LIN2
VR11 RH. LIN1
VR8 GH. LIN2
VR13 BH. LIN1
VR3 TARGET B
VR2 TARGET G
VR1 TARGET R
VR23 GH. CENTERING
VR21 BV. SIZE
VR22 10K
VR15 B. SKEW
SW2 OVERSCAN SWITCH
VL4 RH. SIZE
VL3 GH. SIZE
VL5 BH. SIZE
VR7 TOTAL H. SIZE
VR27 BV. CENTERING
VR26 BH. CENTERING
VR25 RV. CENTERING
VR24 RH. CENTERING
IC4
IC5
IC6
IC8
IC9
IC10
CN1J
CN2J
CN3J
CN4J
CN5J
CN6J
CN7J
CN8J
CN9J
2
3
4
5

CONDUCTOR VIEW OF DEFLECTION BOARD

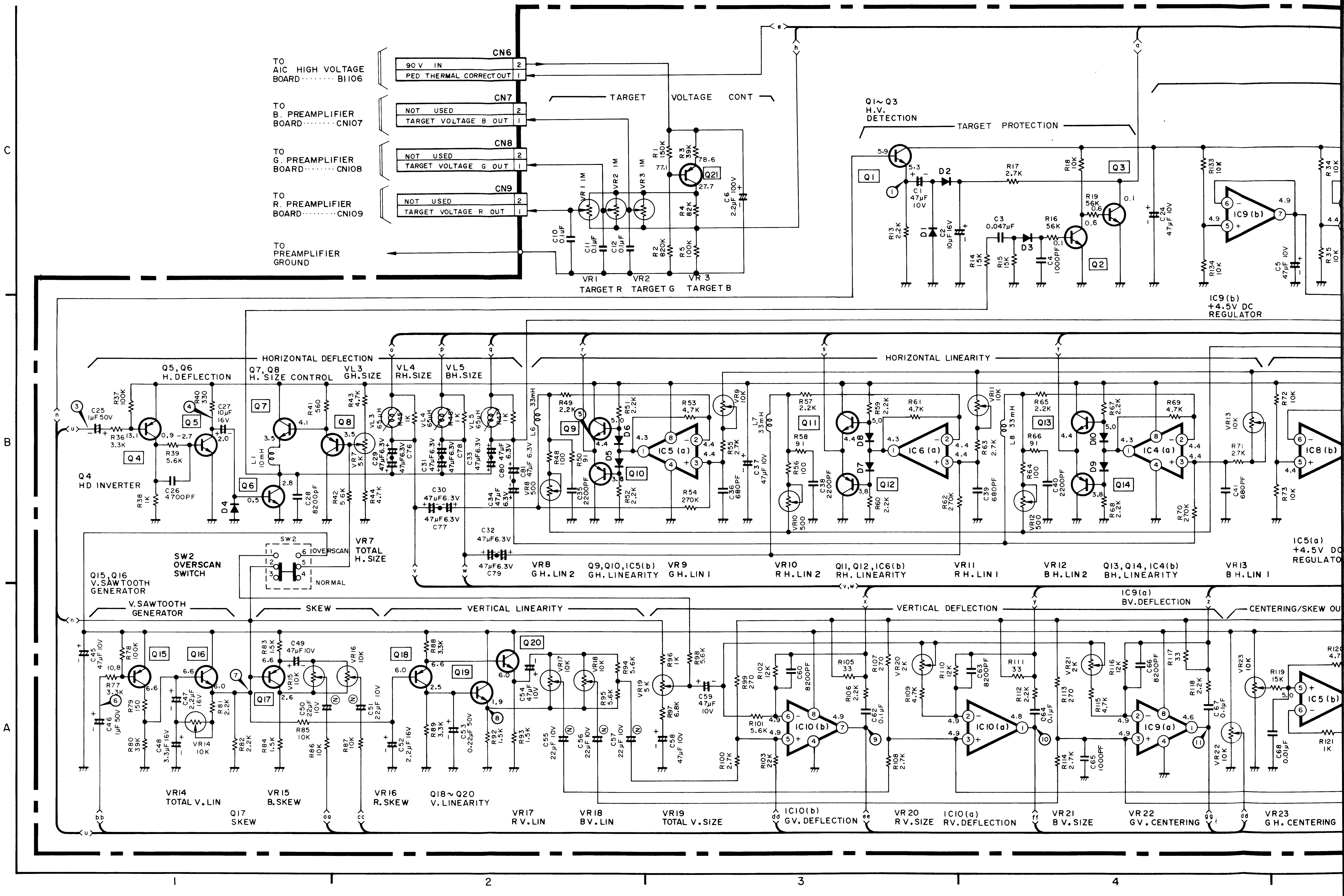


CN7P
2 NOT USED
1 TARGET VOLTAGE B OUT
TO B.PRE AMPLIFIER BOARD ·····CN107
CN8P
2 NOT USED
1 TARGET VOLTAGE G OUT
TO G.PRE AMPLIFIER BOARD ·····CN108
CN9P
2 NOT USED
1 TARGET VOLTAGE R OUT
TO R.PRE AMPLIFIER BOARD ·····CN109
CN6P
2 90V IN
1 PED THERMAL CORRECT OUT
TO AIC HIGH VOLTAGE BOARD ·····B1106
TO PRE AMPLIFIER GROUND
CN1P
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 BH. DEFLECTION(−) OUT
4 BH. DEFLECTION(+) OUT
3 BV. DEFLECTION(−) OUT
2 BV. DEFLECTION(+) OUT
1 GND
B COIL ASSEMBLY
H.DEFLECTION
V.DEFLECTION
CN2P
9 TARGET THERMAL CORRECT IN
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 GH. DEFLECTION(−)OUT
4 GH. DEFLECTION(+)OUT
3 GV. DEFLECTION(−)OUT
2 GV. DEFLECTION(+)OUT
1 GND
G COIL ASSEMBLY
H.DEFLECTION
V.DEFLECTION
CN3P
9 NOT USED
8 PED CORRECT IN
7 NOT USED
6 NOT USED
5 RH DEFLECTION(−) OUT
4 RH. DEFLECTION(+)OUT
3 RV. DEFLECTION(−) OUT
2 RV. DEFLECTION(+)OUT
1 GND
R COIL ASSEMBLY
H. DEFLECTION
V. DEFLECTION
CN5P
1 BV. CENTERING IN
2 RV. CENTERING IN
3 BH. CENTERING IN
4 RH. CENTERING IN
5 GND
6 +9V IN (STANDBY: 0V)
7 −9V OUT
TO ACC/MAN SELECT BOARD ·····B114
CN4P
1 +9V OUT (STANDBY: 0V)
2 Hs IN
3 Vs IN
4 TARGET PROTECTON OUT
5 GND
6 −9V IN
TO HIGH VOLTAGE AIC BOARD ·····B19
CN8J
CN9J
CN6J
C6 2.2μF 100V
VR2 TARGET G
VR1 TARGET R
R3 39K
VR3 1M
VR2 1M
VR1 1M
Q21
R1 150K
R4 82K
C11 0.1μF
C10 0.1μF
R5 100K
R2 820K
VR13 BH. LIN1
VR12 500
VR13 10K
L8 33mH
C68 0.01μF
C43 0.01μF
IC5
IC4
R71 2.7K
R70 270K
R65 2.2K
R69 4.7K
R120 4.7K
R119 15K
R64 100
R74 4.7
C44 0.1μF
C37 47μF 10V
C23 1500P
CN1J
C36 680P
R122 47
R121 1K
R66 91
C41 680PF
R75 47
R76 1K
C40 2200PF
R67 2.2K
Q13
D10
L10 33mH
L9 33mH
VR23 GH.CENTERING
VR23 10K
C69 0.1μF
R68 2.2K
Q14
D9
R51 2.2K
Q9
CN2J
C32 47μF 6.3V
C31 47μF/6.3V
C30 47μF 6.3V
C29 47μF/6.3V
C34 47μF 6.3V
C33 47μF 6.3V
IC9
C79 47μF 6.3V
C78 47μF 6.3V
C77 47μF 6.3V
C76 47μF 6.3V
C81 47μF 6.3V
C80 47μF 6.3V
SW2
OVER SCAN SWITCH
VL4 65μH
VL3 65μH
VL5 65μH
L4 65μH
R14 15K
R46 1K
R45 1K
R47 1K
VL4 RH.SIZE
VL3 GH.SIZE
VL5 BH.SIZE
C72 1500P
CN3J
C24 47μF 10V
L1 10mH
Q7
Q4
C26 4700PF
R41 560
C74 1500PF
VR7 5K
R39 5.6K
D4
C28 8200P
VR7 TOTAL H.SIZE
R38 1K
Q6
Q8
R42 5.6K
Q5
R44 4.7K
R43 4.7K
C27 10μF 16V
R40 330
R126 10K
R127 22K
R128 10K
R129 22K
VR24
VR25
VR26
VR27
VR27 BV.CENTERING
VR26 BH.CENTERING
VR25 RV.CENTERING
VR24 RH.CENTERING
3
4
5
6

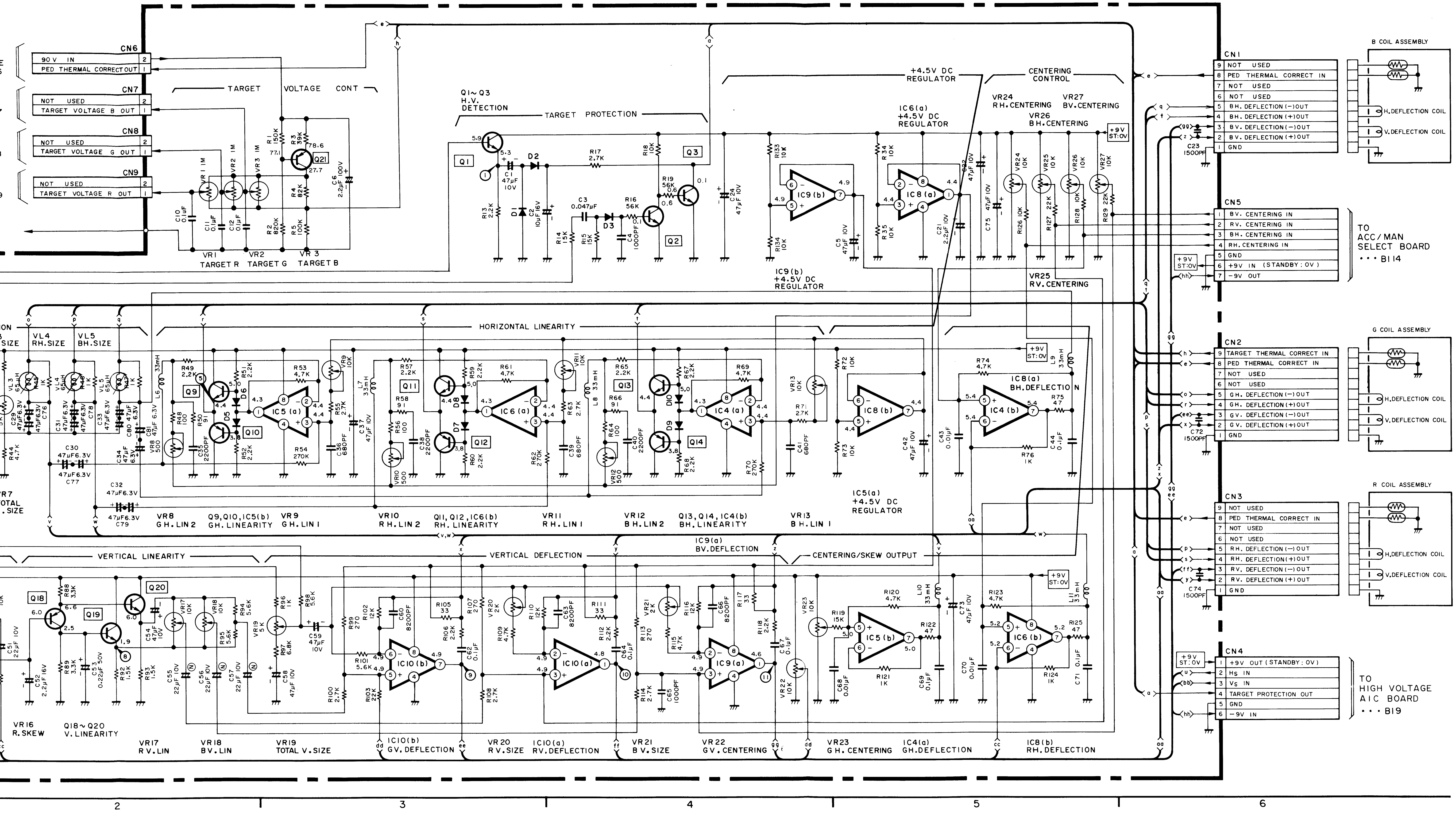
SCHEMATIC DIAGRAM OF DEFLECTION BOARD

Deflection Board

IC4	NJM4556D	B4, B5
IC5	NJM4556D	A5, B3
IC6	NJM4556D	A5, B3
IC8	NJM4556D	B5, C5
IC9	NJM3415D	A4, C4
IC10	NJM3415D	A3, A4
Q1	2SD636-RS	C3
Q2	2SD636-RS	C4
Q3	2SD636-RS	C4
Q4	2SB641-RS	B1
Q5	2SD638-QR	B1
Q6	2SD959-PQ	B1
Q7	2SC1567-QR	B1
Q8	2SA564-RS	B1
Q9	2SD638-QR	B2
Q10	2SB643-RS	B2
Q11	2SD638-QR	B3
Q12	2SB643-RS	B3
Q13	2SD638-QR	B4
Q14	2SD643-RS	B4
Q15	2SB641-RS	A1
Q16	2SD636-RS	A1
Q17	2SB641-RS	A1
Q18	2SB641-RS	A2
Q19	2SD636-RS	A2
Q20	2SD636-RS	A2
Q21	2SB788-RS	C3
D1	MA165	C3
D2	MA165	C3
D3	MA165	C4
D4	MA165	B1
D5	MA165	B2
D6	MA165	B2
D7	MA165	B3
D8	MA165	B3
D9	MA165	B4
D10	MA165	B4


C
B
A
1
2
3
4
TO AIC HIGH VOLTAGE BOARD········B1106
CN6
90 V IN
PED THERMAL CORRECT OUT
TO B. PREAMPLIFIER BOARD········CN107
CN7
NOT USED
TARGET VOLTAGE B OUT
TO G. PREAMPLIFIER BOARD········CN108
CN8
TARGET VOLTAGE G OUT
TO R. PREAMPLIFIER BOARD········CN109
CN9
TARGET VOLTAGE R OUT
TO PREAMPLIFIER GROUND
TARGET VOLTAGE CONT
VR1 TARGET R
VR2 TARGET G
VR3 TARGET B
Q21
Q1~Q3 H.V. DETECTION
TARGET PROTECTION
Q1
Q2
Q3
IC9(b) +4.5V DC REGULATOR
HORIZONTAL DEFLECTION
Q5,Q6 H. DEFLECTION
Q7,Q8 H. SIZE CONTROL
VL3 GH.SIZE
VL4 RH.SIZE
VL5 BH.SIZE
Q4 HD INVERTER
HORIZONTAL LINEARITY
IC5 (a)
IC6 (a)
IC4 (a)
IC8 (b)
SW2 OVERSCAN SWITCH
OVERSCAN
NORMAL
VR7 TOTAL H. SIZE
VR8 GH.LIN 2
Q9,Q10,IC5(b) GH. LINEARITY
VR9 GH.LIN 1
VR10 RH.LIN 2
Q11,Q12,IC6(b) RH. LINEARITY
VR11 RH.LIN 1
VR12 BH.LIN 2
Q13,Q14,IC4(b) BH. LINEARITY
VR13 BH.LIN 1
IC5(a) +4.5V DC REGULATO
Q15,Q16 V.SAWTOOTH GENERATOR
V.SAWTOOTH GENERATOR
SKEW
VERTICAL LINEARITY
VERTICAL DEFLECTION
IC9(a) BV.DEFLECTION
CENTERING/SKEW OU
IC10(b)
IC10(a)
IC9(a)
IC5(b)
VR14 TOTAL V.LIN
VR15 B.SKEW
Q17 SKEW
VR16 R.SKEW
Q18~Q20 V.LINEARITY
VR17 RV.LIN
VR18 BV.LIN
VR19 TOTAL V.SIZE
IC10(b) GV.DEFLECTION
VR20 RV.SIZE
IC10(a) RV.DEFLECTION
VR21 BV.SIZE
VR22 GV.CENTERING
VR23 GH.CENTERING

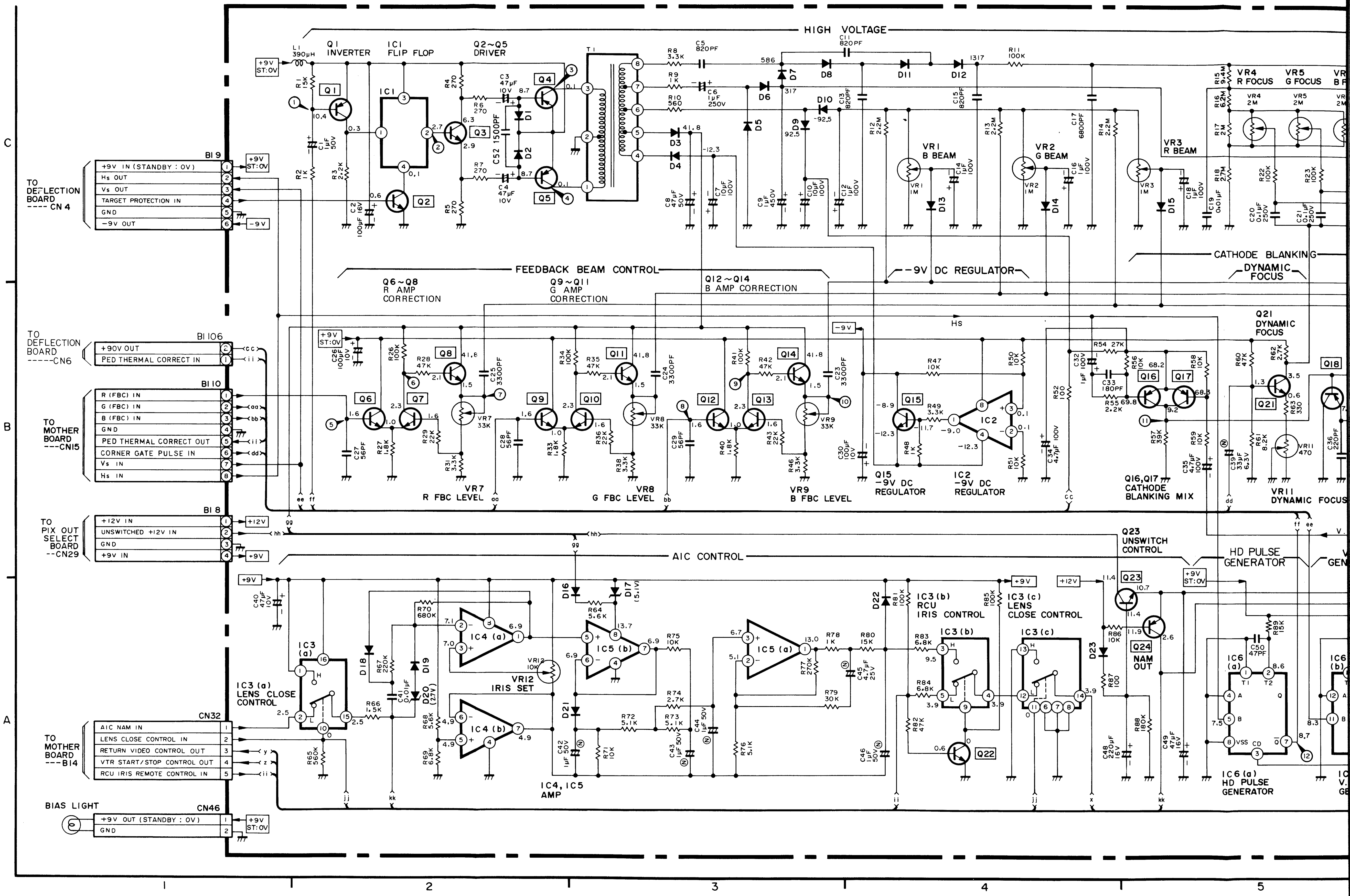
SCHEMATIC DIAGRAM OF DEFLECTION BOARD


CN6
90 V IN
PED THERMAL CORRECT OUT
CN7
NOT USED
TARGET VOLTAGE B OUT
CN8
NOT USED
TARGET VOLTAGE G OUT
CN9
NOT USED
TARGET VOLTAGE R OUT
TARGET VOLTAGE CONT
VR1 TARGET R
VR2 TARGET G
VR3 TARGET B
Q21
Q1~Q3 H.V. DETECTION
TARGET PROTECTION
Q1
Q2
Q3
D1
D2
D3
+4.5V DC REGULATOR
IC6(a) +4.5V DC REGULATOR
IC9(b) +4.5V DC REGULATOR
IC9(b)
IC8(a)
CENTERING CONTROL
VR24 RH.CENTERING
VR27 BV.CENTERING
VR26 BH.CENTERING
VR25 RV.CENTERING
+9V ST:0V
CN1
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 BH. DEFLECTION (−) OUT
4 BH. DEFLECTION (+) OUT
3 BV. DEFLECTION (−) OUT
2 BV. DEFLECTION (+) OUT
1 GND
B COIL ASSEMBLY
H.DEFLECTION COIL
V.DEFLECTION COIL
CN5
1 BV. CENTERING IN
2 RV. CENTERING IN
3 BH. CENTERING IN
4 RH. CENTERING IN
5 GND
6 +9V IN (STANDBY: 0V)
7 −9V OUT
TO ACC/MAN SELECT BOARD ··· B114
VL4 RH.SIZE
VL5 BH.SIZE
HORIZONTAL LINEARITY
Q9
Q10
IC5(a)
Q11
Q12
IC6(a)
Q13
Q14
IC4(a)
IC8(b)
IC8(a) BH.DEFLECTION
IC4(b)
IC5(a) +4.5V DC REGULATOR
VR7 TOTAL H.SIZE
VR8 GH.LIN 2
Q9,Q10,IC5(b) GH.LINEARITY
VR9 GH.LIN 1
VR10 RH.LIN 2
Q11,Q12,IC6(b) RH.LINEARITY
VR11 RH.LIN 1
VR12 BH.LIN 2
Q13,Q14,IC4(b) BH.LINEARITY
VR13 BH.LIN 1
G COIL ASSEMBLY
CN2
9 TARGET THERMAL CORRECT IN
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 GH. DEFLECTION (−) OUT
4 GH. DEFLECTION (+) OUT
3 GV. DEFLECTION (−) OUT
2 GV. DEFLECTION (+) OUT
1 GND
VERTICAL LINEARITY
VERTICAL DEFLECTION
IC9(a) BV.DEFLECTION
CENTERING/SKEW OUTPUT
Q18
Q19
Q20
IC10(b)
IC10(a)
IC9(b)
IC5(b)
IC6(b)
VR16 R.SKEW
Q18~Q20 V.LINEARITY
VR17 RV.LIN
VR18 BV.LIN
VR19 TOTAL V.SIZE
IC10(b) GV.DEFLECTION
VR20 RV.SIZE
IC10(a) RV.DEFLECTION
VR21 BV.SIZE
VR22 GV.CENTERING
VR23 GH.CENTERING
IC4(a) GH.DEFLECTION
IC8(b) RH.DEFLECTION
R COIL ASSEMBLY
CN3
9 NOT USED
8 PED THERMAL CORRECT IN
7 NOT USED
6 NOT USED
5 RH. DEFLECTION (−) OUT
4 RH. DEFLECTION (+) OUT
3 RV. DEFLECTION (−) OUT
2 RV. DEFLECTION (+) OUT
1 GND
CN4
1 +9V OUT (STANDBY: 0V)
2 Hs IN
3 Vs IN
4 TARGET PROTECTION OUT
5 GND
6 −9V IN
TO HIGH VOLTAGE AIC BOARD ··· B19
2
3
4
5
6

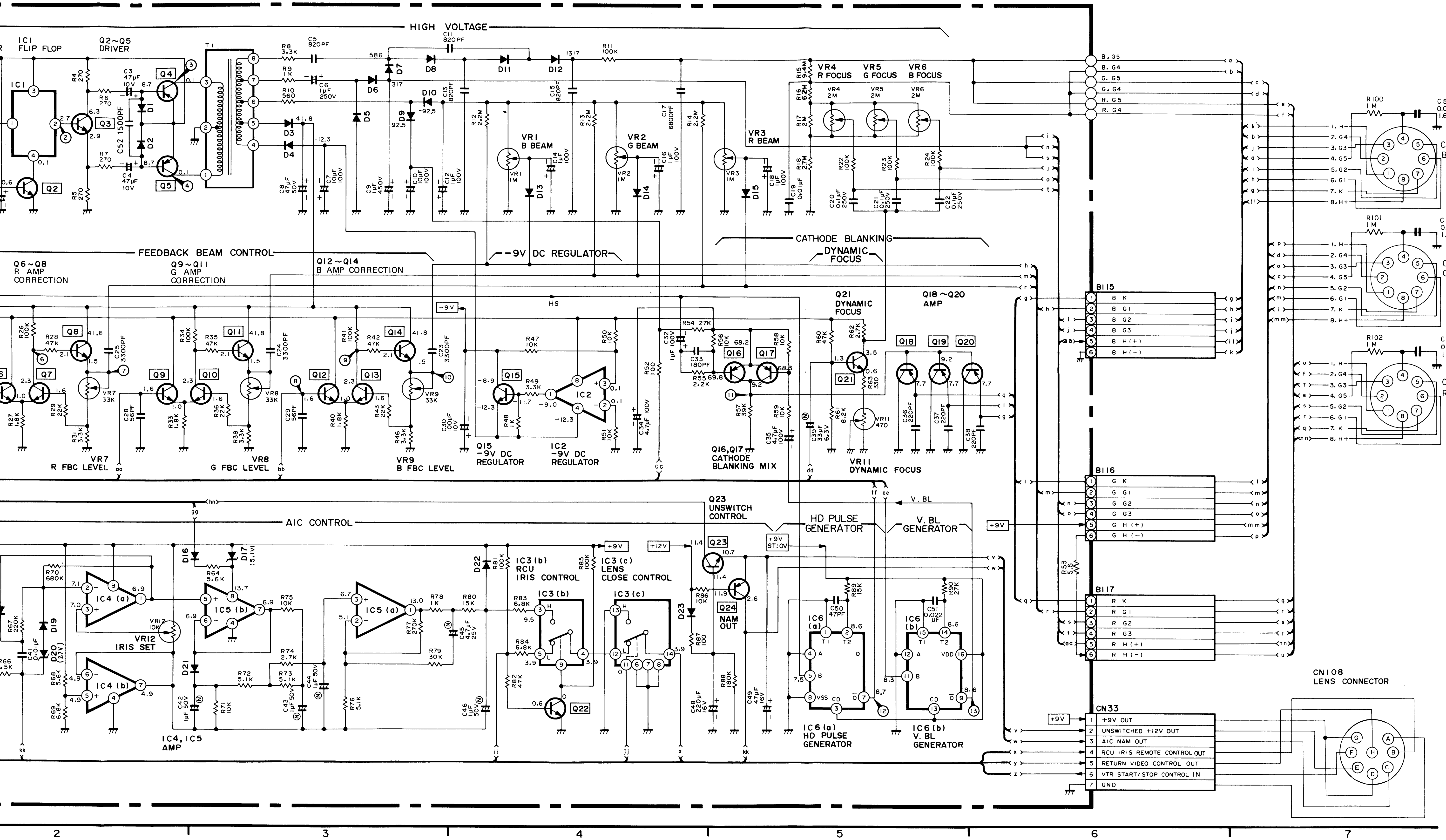
SCHEMATIC DIAGRAM OF HIGH VOLTAGE AIC BOARD

High Voltage Board

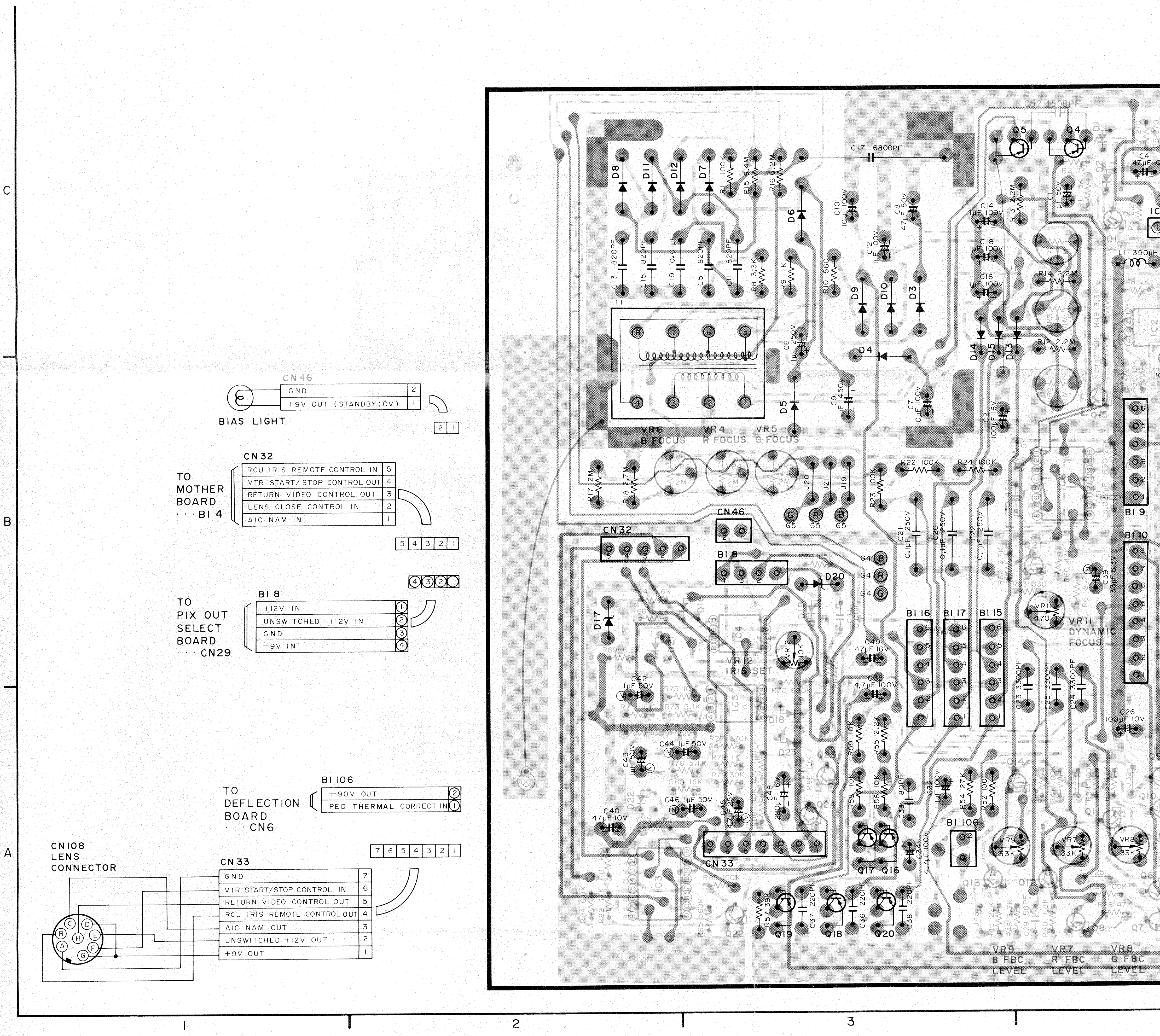
IC1	DN819		C1
IC2	NJM4558M		B4
IC3	HD14053BFP		A2, A4
IC4	NJM4558M		A2
IC5	NJM4558M		A3
IC6	TC4538BF		A5
Q1	2SB709-QRS	(A)	C2
Q2	2SD601-QRS	(Y)	C2
Q3	2SC1384-RS		C2
Q4	2SA684-RS		C2
Q5	2SA684-RS		C2
Q6	2SD601-QRS	(Y)	B2
Q7	2SD814-QRS	(P)	B2
Q8	2SD814-QRS	(P)	B2
Q9	2SD601-QRS	(Y)	B2
Q10	2SD814-QRS	(P)	B3
Q11	2SD814-QRS	(P)	B3
Q12	2SD601-QRS	(Y)	B3
Q13	2SD814-QRS	(P)	B3
Q14	2SD814-QRS	(P)	B3
Q15	2SD602-QRS	(W)	B4
Q16	2SB788-RS		B5
Q17	2SB788-RS		B5
Q18	2SB788-RS		B5
Q19	2SB788-RS		B5
Q20	2SB788-RS		B6
Q21	2SD601-QRS	(Y)	B5
Q22	2SD601-QRS	(Y)	A4
Q23	2SD602-QRS	(W)	A5
Q24	2SB709-QRS	(A)	A5
D1	MA151A	(MA)	C2
D2	MA151A	(MA)	C2
D3	ES1F		C3
D4	ES1F		C3
D5	ES1F		C3
D6	ES1F		C3
D7	ES1F		C3
D8	ES1F		C3
D9	ES1F		C3
D10	ES1F		C3
D11	ES1F		C4
D12	ES1F		C4
D13	MA162		C4
D14	MA162		C4
D15	MA162		C5
D16	MA151A	(MA)	A3
D17	MA4051L		A3
D18	MA151A	(MA)	A2
D19	MA151A	(MA)	A2
D20	05Z2.7		A2
D21	MA151A	(MA)	A3
D22	MA151A	(MA)	A4
D23	MA151A	(MA)	A4


HIGH VOLTAGE
Q1 INVERTER
IC1 FLIP FLOP
Q2~Q5 DRIVER
T1
VR4 R FOCUS
VR5 G FOCUS
VR1 B BEAM
VR2 G BEAM
VR3 R BEAM
-9V DC REGULATOR
CATHODE BLANKING
DYNAMIC FOCUS
FEEDBACK BEAM CONTROL
Q6~Q8 R AMP CORRECTION
Q9~Q11 G AMP CORRECTION
Q12~Q14 B AMP CORRECTION
VR7 R FBC LEVEL
VR8 G FBC LEVEL
VR9 B FBC LEVEL
Q15 -9V DC REGULATOR
IC2 -9V DC REGULATOR
Q16,Q17 CATHODE BLANKING MIX
Q21 DYNAMIC FOCUS
VR11 DYNAMIC FOCUS
Q23 UNSWITCH CONTROL
HD PULSE GENERATOR
AIC CONTROL
IC3 (a) LENS CLOSE CONTROL
VR12 IRIS SET
IC4, IC5 AMP
IC3 (b) RCU IRIS CONTROL
IC3 (c) LENS CLOSE CONTROL
Q24 NAM OUT
IC6 (a) HD PULSE GENERATOR
TO DEFLECTION BOARD ---- CN4
B19
+9V IN (STANDBY : OV)
Hs OUT
Vs OUT
TARGET PROTECTION IN
GND
-9V OUT
TO DEFLECTION BOARD -----CN6
B1106
+90V OUT
PED THERMAL CORRECT IN
TO MOTHER BOARD ---CN15
B110
R (FBC) IN
G (FBC) IN
B (FBC) IN
GND
PED THERMAL CORRECT OUT
CORNER GATE PULSE IN
Vs IN
Hs IN
TO PIX OUT SELECT BOARD --CN29
B18
+12V IN
UNSWITCHED +12V IN
GND
+9V IN
TO MOTHER BOARD ---B14
CN32
AIC NAM IN
LENS CLOSE CONTROL IN
RETURN VIDEO CONTROL OUT
VTR START/STOP CONTROL OUT
RCU IRIS REMOTE CONTROL IN
BIAS LIGHT
CN46
+9V OUT (STANDBY : OV)
GND
C
B
A
1
2
3
4
5

SCHEMATIC DIAGRAM OF HIGH VOLTAGE AIC BOARD


HIGH VOLTAGE
IC1 FLIP FLOP
Q2~Q5 DRIVER
T1
D5 D6 D7 D8 D9 D10 D11 D12
VR4 R FOCUS
VR5 G FOCUS
VR6 B FOCUS
VR1 B BEAM
VR2 G BEAM
VR3 R BEAM
FEEDBACK BEAM CONTROL
Q6~Q8 R AMP CORRECTION
Q9~Q11 G AMP CORRECTION
Q12~Q14 B AMP CORRECTION
-9V DC REGULATOR
CATHODE BLANKING
DYNAMIC FOCUS
Q21 DYNAMIC FOCUS
Q18~Q20 AMP
VR7 R FBC LEVEL
VR8 G FBC LEVEL
VR9 B FBC LEVEL
Q15 -9V DC REGULATOR
IC2 -9V DC REGULATOR
Q16,Q17 CATHODE BLANKING MIX
VR11 DYNAMIC FOCUS
Hs
AIC CONTROL
IC4 (a)
IC4 (b)
IC5 (a)
IC5 (b)
VR12 IRIS SET
IC4, IC5 AMP
IC3 (b) RCU IRIS CONTROL
IC3 (c) LENS CLOSE CONTROL
Q22
Q23 UNSWITCH CONTROL
Q24 NAM OUT
HD PULSE GENERATOR
V. BL GENERATOR
IC6 (a) HD PULSE GENERATOR
IC6 (b) V. BL GENERATOR
V. BL
+9V
+12V
+9V ST: 0V
B. G5
B. G4
G. G5
G. G4
R. G5
R. G4
B115
1 B K
2 B G1
3 B G2
4 B G3
5 B H(+)
6 B H(-)
B116
1 G K
2 G G1
3 G G2
4 G G3
5 G H(+)
6 G H(-)
B117
1 R K
2 R G1
3 R G2
4 R G3
5 R H(+)
6 R H(-)
CN33
1 +9V OUT
2 UNSWITCHED +12V OUT
3 AIC NAM OUT
4 RCU IRIS REMOTE CONTROL OUT
5 RETURN VIDEO CONTROL OUT
6 VTR START/STOP CONTROL IN
7 GND
CN42 B TUBE SOCKET
CN43 G TUBE SOCKET
CN44 R TUBE SOCKET
1. H
2. G4
3. G3
4. G5
5. G2
6. G1
7. K
8. H+
R100 1M
R101 1M
R102 1M
C52 0.022μF 1.6KV
C53 0.022μF 1.6KV
C54 0.022μF 1.6KV
CN108 LENS CONNECTOR
2
3
4
5
6
7

CONDUCTOR VIEW OF HIGH VOLTAGE AIC BOARD


CN 46
GND
+9V OUT (STANDBY:0V)
BIAS LIGHT
CN 32
TO MOTHER BOARD ··· BI 4
RCU IRIS REMOTE CONTROL IN
VTR START/STOP CONTROL OUT
RETURN VIDEO CONTROL OUT
LENS CLOSE CONTROL IN
AIC NAM IN
BI 8
TO PIX OUT SELECT BOARD ··· CN29
+12V IN
UNSWITCHED +12V IN
GND
+9V IN
BI 106
TO DEFLECTION BOARD ··· CN6
+90V OUT
PED THERMAL CORRECT IN
CN108 LENS CONNECTOR
CN 33
GND
VTR START/STOP CONTROL IN
RETURN VIDEO CONTROL OUT
RCU IRIS REMOTE CONTROL OUT
AIC NAM OUT
UNSWITCHED +12V OUT
+9V OUT
C52 1500PF
C17 6800PF
T1
VR6 B FOCUS
VR4 R FOCUS
VR5 G FOCUS
VR12 IRIS SET
VR11 DYNAMIC FOCUS
VR9 B FBC LEVEL
VR7 R FBC LEVEL
VR8 G FBC LEVEL
BI 9
BI 10
BI 16
BI 17
BI 15
L1 390μH
C
B
A
1
2
3

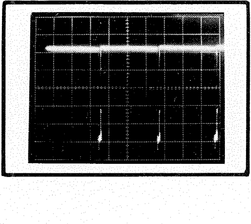
High Voltage Board

IC1	DN819		C4
IC2	NJM4558M		C4
IC3	HD14053BFP		A2
IC4	NJM4558M		B3
IC5	NJM4558M		A3
IC6	TC4538BF		B4
Q1	2SB709-QRS	(A)	C4
Q2	2SD601-QRS	(Y)	C4
Q3	2SC1384-RS		C4
Q4	2SA684-RS		C4
Q5	2SA684-RS		C4
Q6	2SD601-QRS	(Y)	A4
Q7	2SD814-QRS	(P)	A4
Q8	2SD814-QRS	(P)	A4
Q9	2SD601-QRS	(Y)	A4
Q10	2SD814-QRS	(P)	A4
Q11	2SD814-QRS	(P)	A4
Q12	2SD601-QRS	(Y)	A4
Q13	2SD814-QRS	(P)	A3
Q14	2SD814-QRS	(P)	A3
Q15	2SD602-QRS	(W)	B4
Q16	2SB788-RS		A3
Q17	2SB788-RS		A3
Q18	2SB788-RS		A3
Q19	2SB788-RS		A3
Q20	2SB788-RS		A3
Q21	2SD601-QRS	(Y)	B4
Q22	2SD601-QRS	(Y)	A3
Q23	2SD602-QRS	(W)	A3
Q24	2SB709-QRS	(A)	A3
D1	MA151A	(MA)	C4
D2	MA151A	(MA)	C4
D3	ES1F		C2
D4	ES1F		C3
D5	ES1F		C3
D6	ES1F		C3
D7	ES1F		C3
D8	ES1F		C3
D9	ES1F		C3
D10	ES1F		C2
D11	ES1F		C3
D12	ES1F		C3
D13	MA162		
D14	MA162		
D15	MA162		
D16	MA151A		
D17	MA4051L		
D18	MA151A		
D19	MA151A		
D20	05Z2.7		
D21	MA151A		
D22	MA151A		
D23	MA151A		

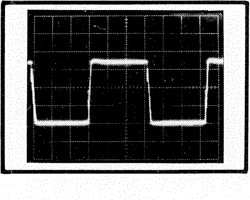
GH VOLTAGE AIC BOARD

SIGNA HIGH

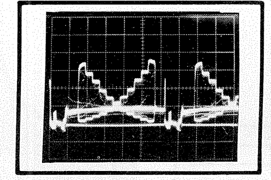
1 0.5V/DIV, 20µs/DIV



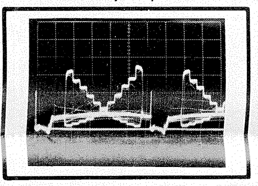
4 5V/DIV, 20µs/DIV



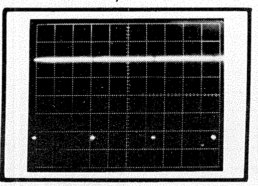
7 1V/DIV, 10µs/DIV

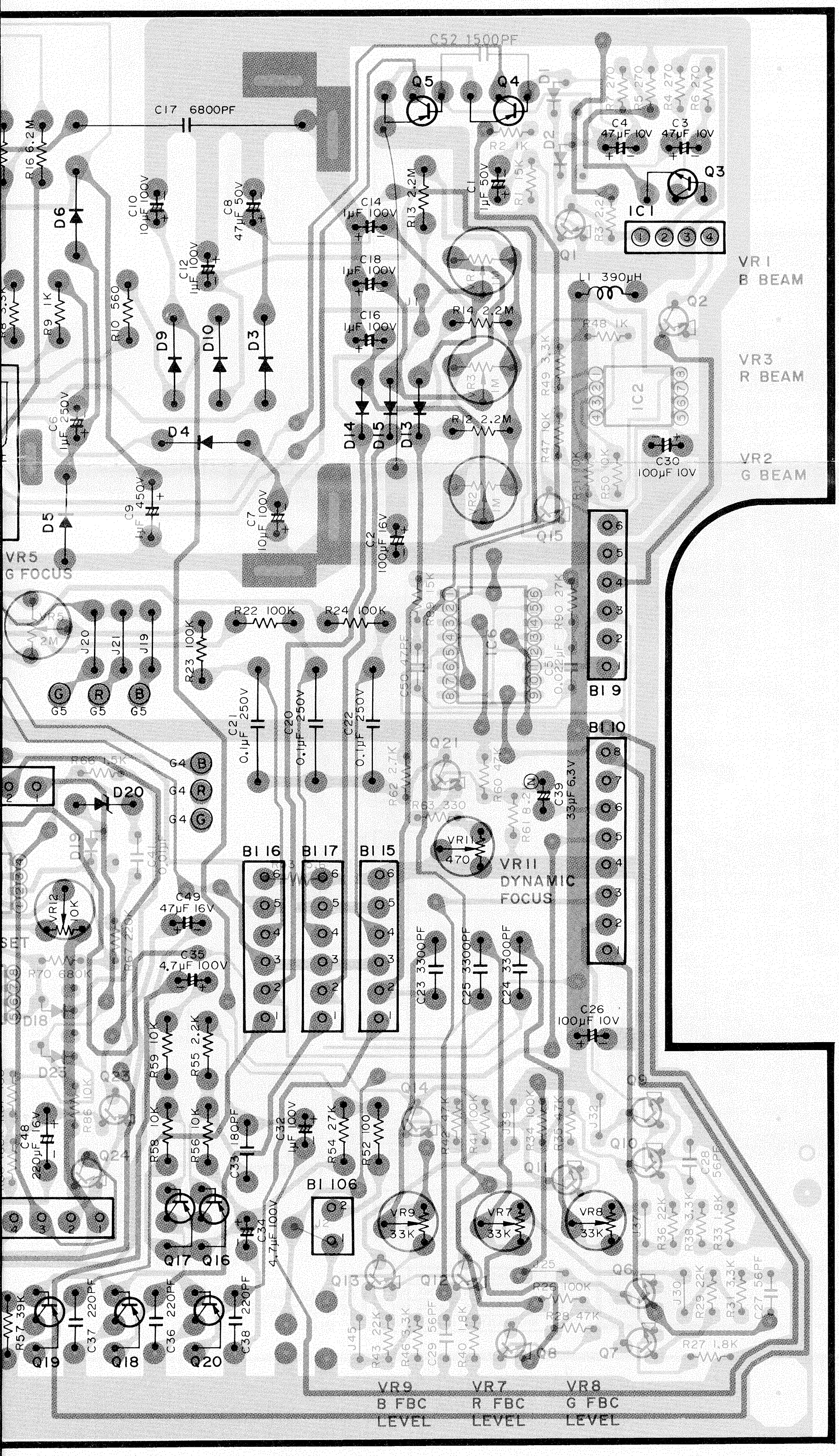


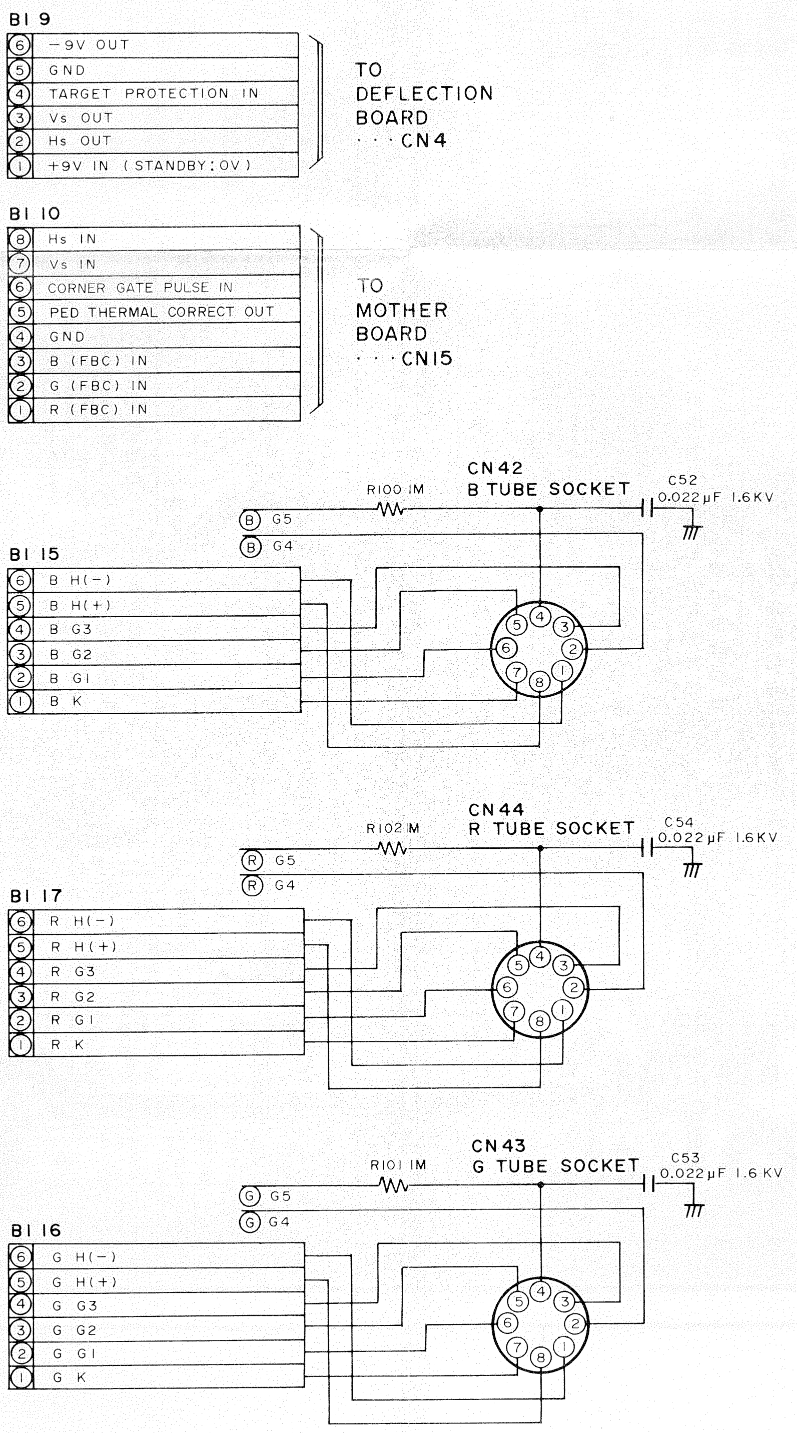
10 1V/DIV, 10µs/DIV



13 2V/DIV, 5ms/DIV

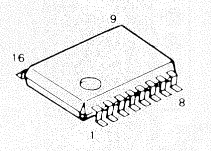




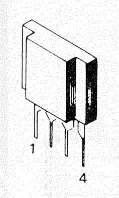

B1 9
⑥ −9V OUT
⑤ GND
④ TARGET PROTECTION IN
③ Vs OUT
② Hs OUT
① +9V IN (STANDBY:0V)
TO DEFLECTION BOARD ···CN4
B1 10
⑧ Hs IN
⑦ Vs IN
⑥ CORNER GATE PULSE IN
⑤ PED THERMAL CORRECT OUT
④ GND
③ B (FBC) IN
② G (FBC) IN
① R (FBC) IN
TO MOTHER BOARD ···CN15
CN42 B TUBE SOCKET
R100 1M
C52 0.022µF 1.6KV
B G5
B G4
B1 15
⑥ B H(−)
⑤ B H(+)
④ B G3
③ B G2
② B G1
① B K
CN44 R TUBE SOCKET
R102 1M
C54 0.022µF 1.6KV
R G5
R G4
B1 17
⑥ R H(−)
⑤ R H(+)
④ R G3
③ R G2
② R G1
① R K
CN43 G TUBE SOCKET
R101 1M
C53 0.022µF 1.6KV
G G5
G G4
B1 16
⑥ G H(−)
⑤ G H(+)
④ G G3
③ G G2
② G G1
① G K

3 4 5

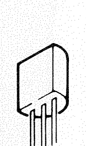
HD14053BFP



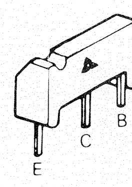
DN819



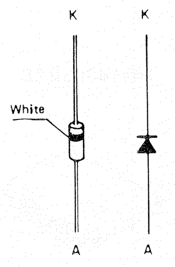
2SA684-RS
2SC1384-RS



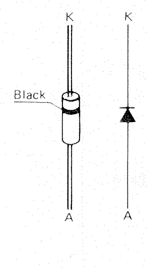
2SB788-RS



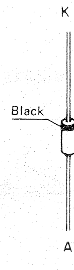
ES1F



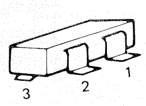
MA162



MA

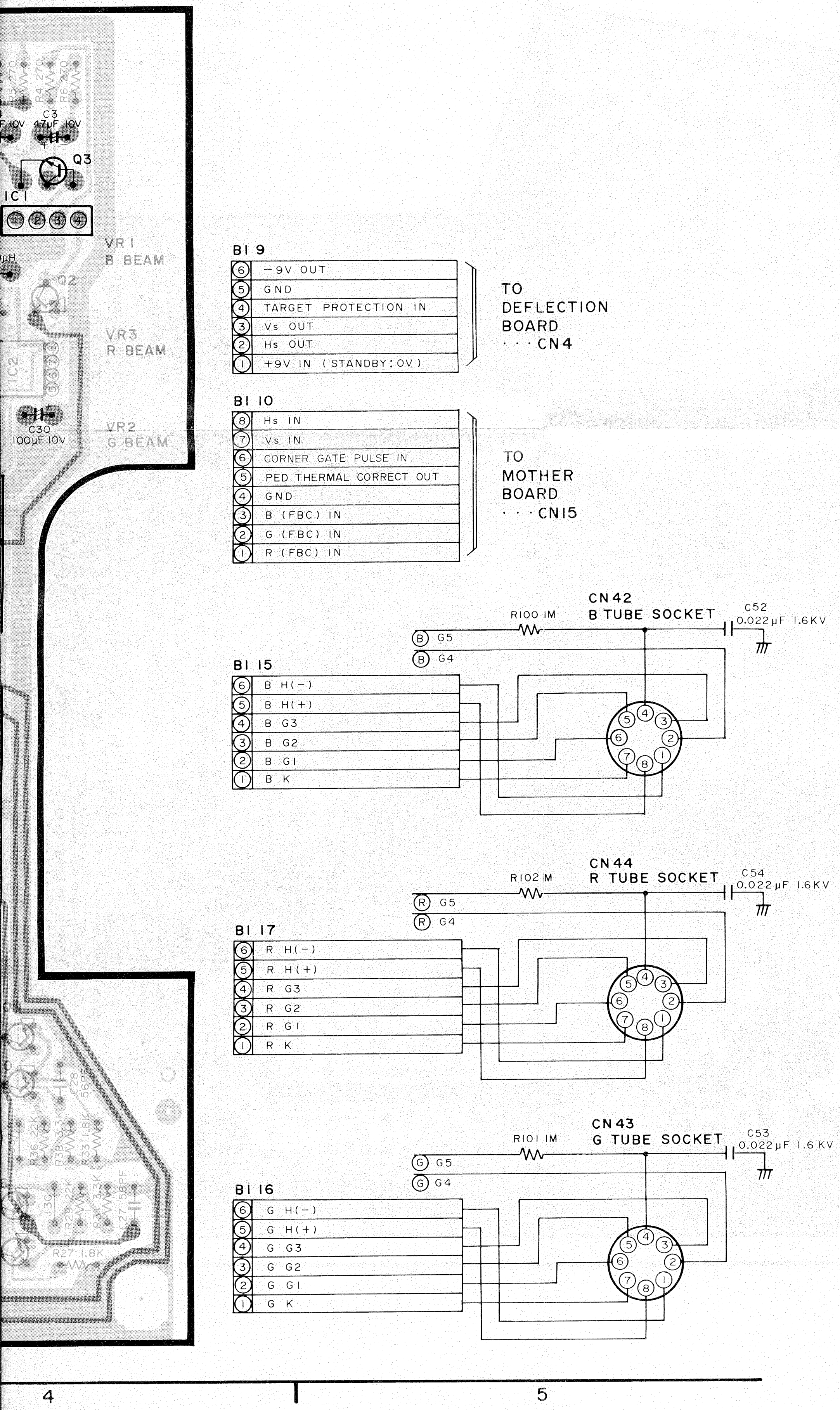


MA151A



1 : Cathode
2 : Cathode
3 : Anode

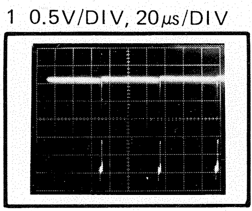
D1	MA151A	(MA)	C4	D13	MA162		C4
D2	MA151A	(MA)	C4	D14	MA162		C3
D3	ES1F		C2	D15	MA162		C3
D4	ES1F		C3	D16	MA151A	(MA)	B2
D5	ES1F		C3	D17	MA4051L		B2
D6	ES1F		C3	D18	MA151A	(MA)	A3
D7	ES1F		C3	D19	MA151A	(MA)	B3
D8	ES1F		C3	D20	05Z2.7		B3
D9	ES1F		C3	D21	MA151A	(MA)	B2
D10	ES1F		C2	D22	MA151A	(MA)	A2
D11	ES1F		C3	D23	MA151A	(MA)	A3
D12	ES1F		C3				


R5 270
R4 270
R6 270
C3 47µF 10V
Q3
IC1
① ② ③ ④
VR1 B BEAM
Q2
VR3 R BEAM
IC2
C30 100µF 10V
VR2 G BEAM
C28 56PF
R36 22K
R33 1.8K
R31 3.3K
R29 22K
C27 56PF
R27 1.8K
BI 9
⑥ −9V OUT
⑤ GND
④ TARGET PROTECTION IN
③ Vs OUT
② Hs OUT
① +9V IN (STANDBY:0V)
TO DEFLECTION BOARD ···CN4
BI 10
⑧ Hs IN
⑦ Vs IN
⑥ CORNER GATE PULSE IN
⑤ PED THERMAL CORRECT OUT
④ GND
③ B (FBC) IN
② G (FBC) IN
① R (FBC) IN
TO MOTHER BOARD ···CN15
CN42
B TUBE SOCKET
R100 1M
C52 0.022µF 1.6KV
Ⓑ G5
Ⓑ G4
BI 15
⑥ B H(−)
⑤ B H(+)
④ B G3
③ B G2
② B G1
① B K
CN44
R TUBE SOCKET
R102 1M
C54 0.022µF 1.6KV
Ⓡ G5
Ⓡ G4
BI 17
⑥ R H(−)
⑤ R H(+)
④ R G3
③ R G2
② R G1
① R K
CN43
G TUBE SOCKET
R101 1M
C53 0.022µF 1.6KV
Ⓖ G5
Ⓖ G4
BI 16
⑥ G H(−)
⑤ G H(+)
④ G G3
③ G G2
② G G1
① G K
4
5

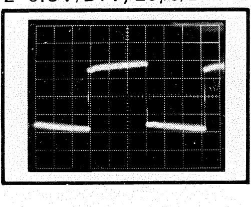
C4
C3
C3
(MA) B2
B2
(MA) A3
(MA) B3
B3
(MA) B2
(MA) A2
(MA) A3

SIGNAL WAVEFORMS OF HIGH VOLTAGE AIC BOARD

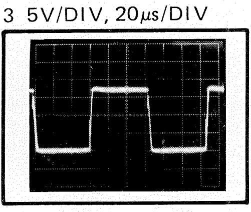
1 0.5V/DIV, 20µs/DIV



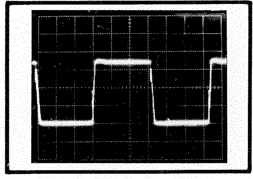
2 0.5V/DIV, 20µs/DIV



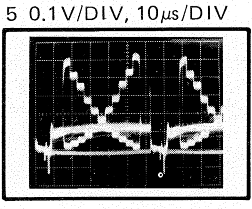
3 5V/DIV, 20µs/DIV



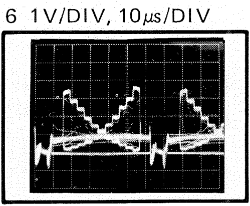
4 5V/DIV, 20µs/DIV



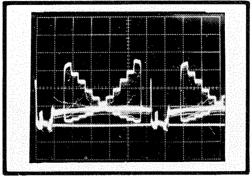
5 0.1V/DIV, 10µs/DIV



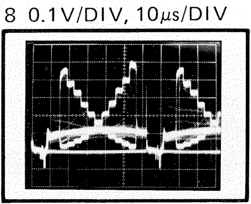
6 1V/DIV, 10µs/DIV



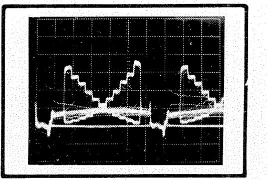
7 1V/DIV, 10µs/DIV



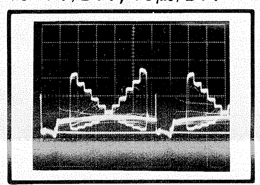
8 0.1V/DIV, 10µs/DIV



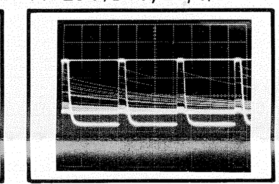
9 1V/DIV, 10µs/DIV



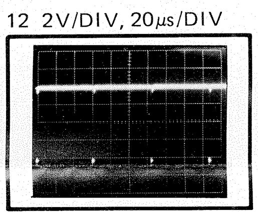
10 1V/DIV, 10µs/DIV



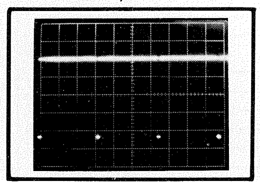
11 20V/DIV, 20µs/DIV



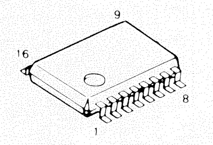
12 2V/DIV, 20µs/DIV



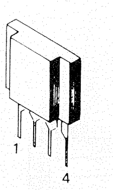
13 2V/DIV, 5ms/DIV



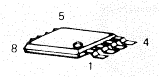
HD14053BFP



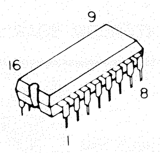
DN819



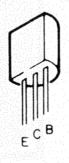
NJM4558M



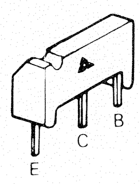
TC4053BF
TC4538BF



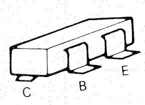
2SA684-RS
2SC1384-RS



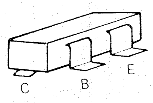
2SB788-RS



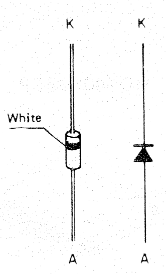
2SB709-QRS



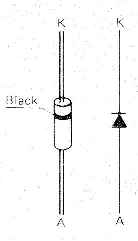
2SB709-QRS
2SD601-QRS
2SD602-QRS
2SD814-QRS



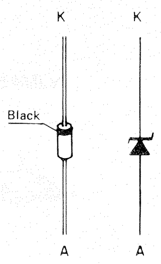
ES1F



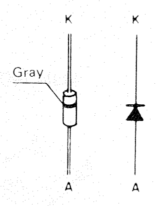
MA162



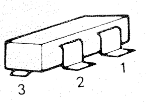
MA4051L



05Z2.7

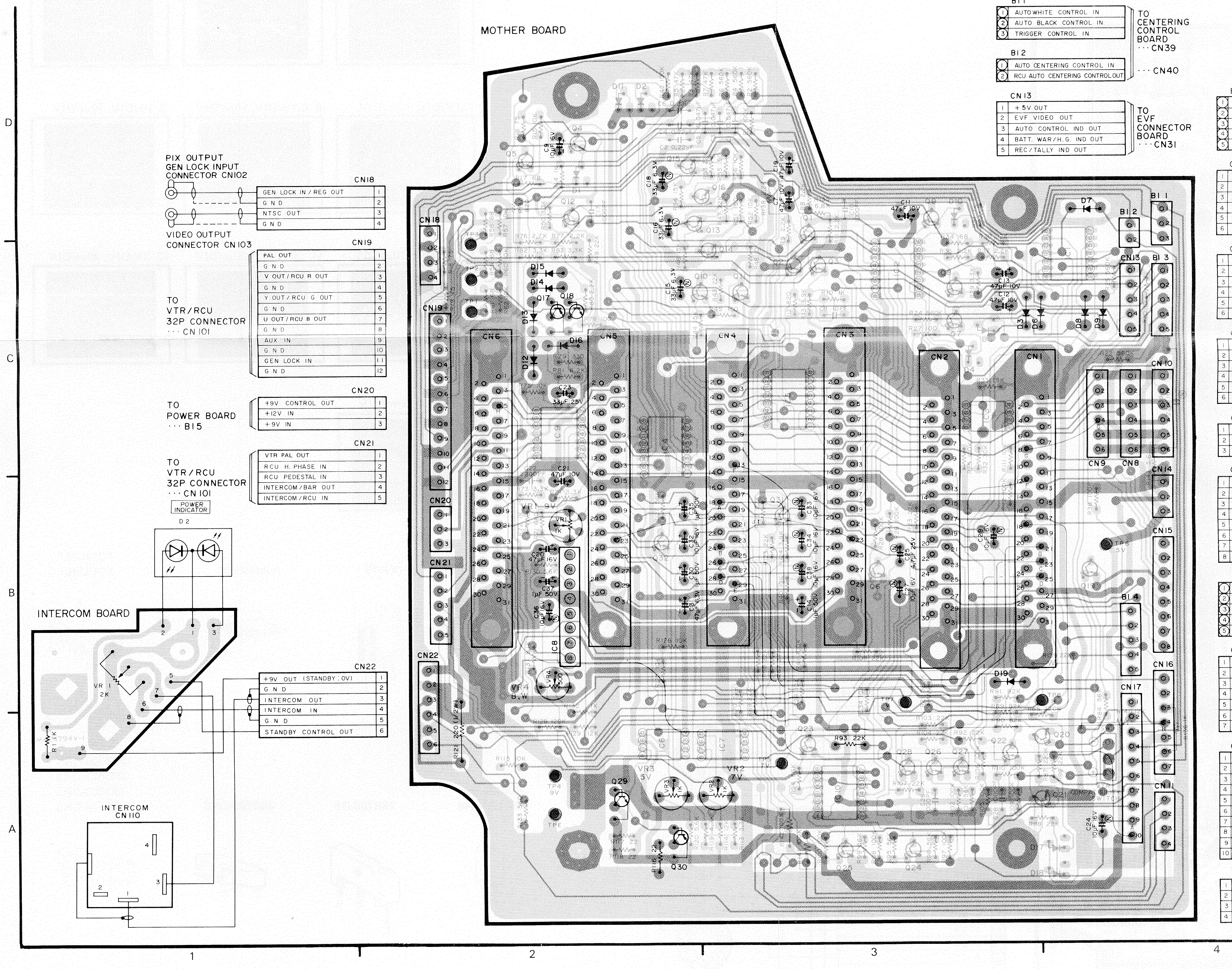


MA151A

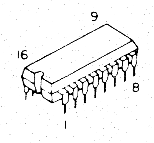


1 : Cathode
2 : Cathode
3 : Anode

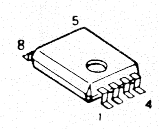
CONDUCTOR VIEW OF MOTHER BOARD


MOTHER BOARD
PIX OUTPUT
GEN LOCK INPUT
CONNECTOR CN102
CN18
GEN LOCK IN / REG OUT 1
G N D 2
NTSC OUT 3
G N D 4
VIDEO OUTPUT
CONNECTOR CN103
CN19
PAL OUT 1
G N D 2
V OUT / RCU R OUT 3
G N D 4
Y OUT / RCU G OUT 5
G N D 6
U OUT / RCU B OUT 7
G N D 8
AUX IN 9
G N D 10
GEN LOCK IN 11
G N D 12
TO
VTR / RCU
32P CONNECTOR
··· CN 101
CN20
+9V CONTROL OUT 1
+12V IN 2
+9V IN 3
TO
POWER BOARD
··· B15
CN21
VTR PAL OUT 1
RCU H. PHASE IN 2
RCU PEDESTAL IN 3
INTERCOM / BAR OUT 4
INTERCOM / RCU IN 5
TO
VTR / RCU
32P CONNECTOR
··· CN 101
POWER INDICATOR
D 2
INTERCOM BOARD
VR 1
2K
R1 1K
CN22
+9V OUT (STANDBY : OV) 1
G N D 2
INTERCOM OUT 3
INTERCOM IN 4
G N D 5
STANDBY CONTROL OUT 6
INTERCOM
CN110
B11
1 AUTOWHITE CONTROL IN
2 AUTO BLACK CONTROL IN
3 TRIGGER CONTROL IN
TO
CENTERING
CONTROL
BOARD
··· CN39
B12
1 AUTO CENTERING CONTROL IN
2 RCU AUTO CENTERING CONTROL OUT
··· CN40
CN13
1 + 5V OUT
2 EVF VIDEO OUT
3 AUTO CONTROL IND OUT
4 BATT. WAR / H.G. IND OUT
5 REC / TALLY IND OUT
TO
EVF
CONNECTOR
BOARD
··· CN31
CN1
CN2
CN3
CN4
CN5
CN6
CN8
CN9
CN10
CN11
CN14
CN15
CN16
CN17
B13
B14
IC6
IC7
IC8
VR1
VR2
VR3
VR4
TP4 9V
TP5 5V
D
C
B
A
1
2
3
4

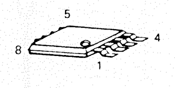
TC4053BF



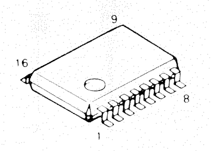
NJM2903M



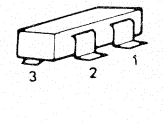
NJM4558M



HD14053BFP

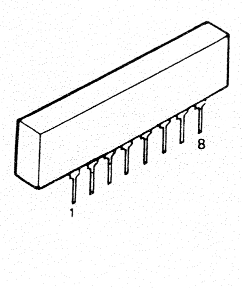


MA151A

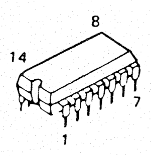


1 : Cathode
2 : Cathode
3 : Anode

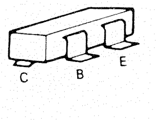
YFM5232L



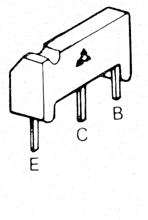
YFNJM723M
YFTC4011BF



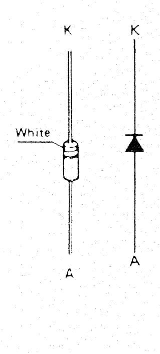
2SB709-QRS
2SC2405STU
2SD601-QRS
2SD602-QRS



2SB793A-RS
2SD636-RS
2SD973A-RS



MA165



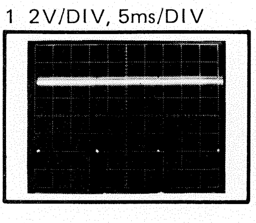
Mother Board

IC1	YFTC4011BF		C4	Q14
IC2	HD14053BFP		C3	Q15
IC3	NJM2903M		C3	Q16
IC4	TC4053BF		B2, C2	Q17
IC5	TC4053BF		C3	Q18
IC6	NJM4558M		A2	Q19
IC7	NJM4558M		A3	Q20
IC8	YFM5232L		B2	Q21
IC9	YFNJM723M		C2	Q22
IC10	YFTC4011BF		A3	Q23
Q1	2SD601-QRS	(Y)	D3	Q24
Q2	2SD601-QRS	(Y)	C3	Q25
Q3	2SD601-QRD	(Y)	C3	Q26
Q4	2SD602-QRS	(W)	D2	Q27
Q5	2SC2405STU	(S)	D2	Q28
Q6	2SD601-QRS	(Y)	B3	Q29
Q7	2SB709-QRS	(A)	C3	Q30
Q8	2SB709-QRS	(A)	C3	Q31
Q9	2SD602-QRS	(W)	D3	Q32
Q10	2SD602-QRS	(W)	C3	D1
Q11	2SC2405STU	(S)	C3	D2
Q12	2SB709-QRS	(Y)	D2	D3
Q13	2SD602-QRS	(W)	D3	D4

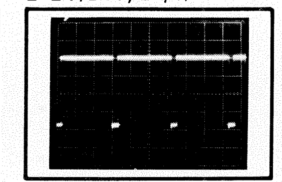
OTHER BOARD

SIGNAL WAVEFORMS

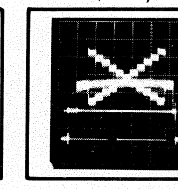
1 2V/DIV, 5ms/DIV

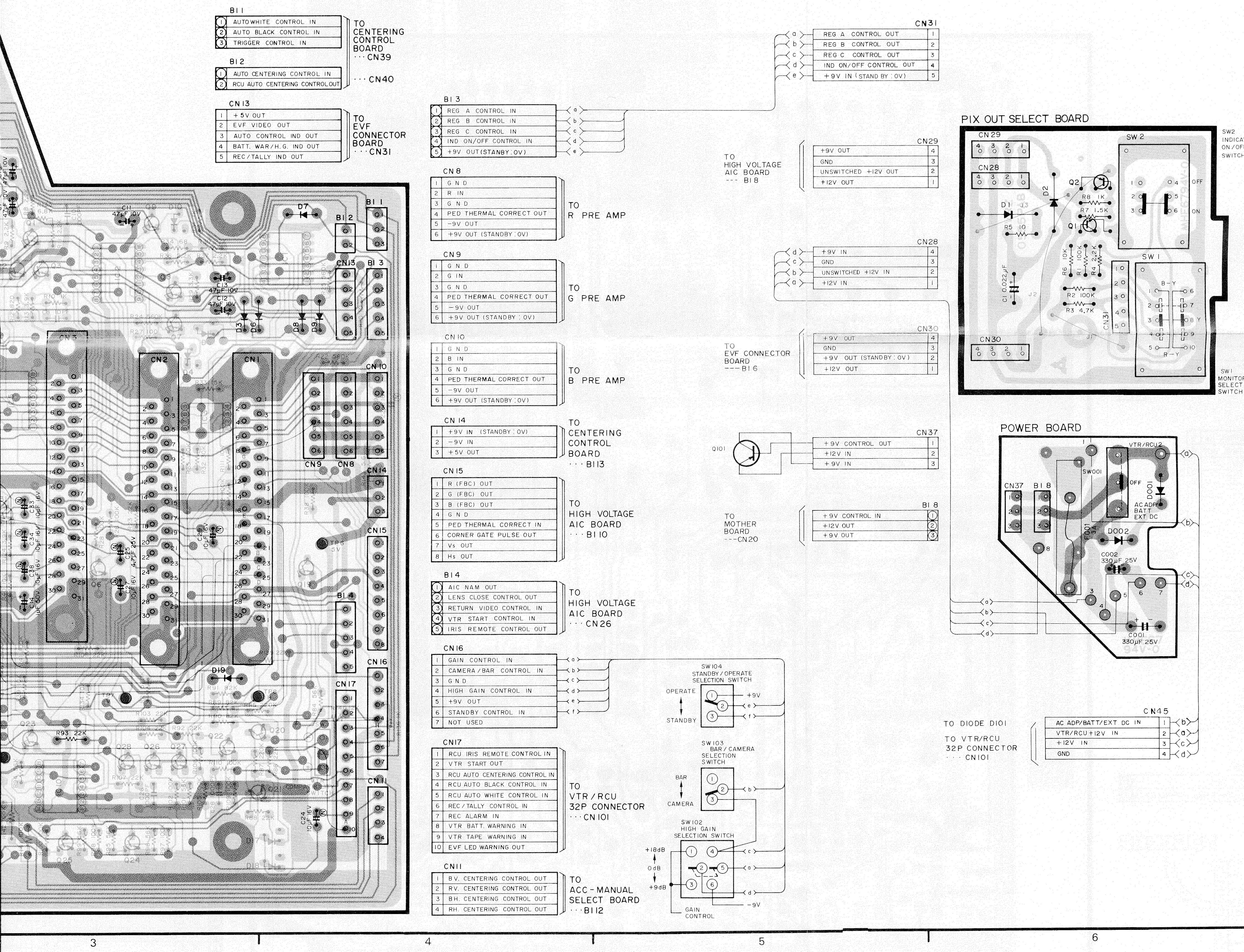


2 2V/DIV, 20μs/DIV



3 0.2V/DIV, 10



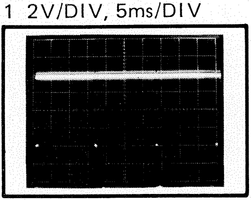


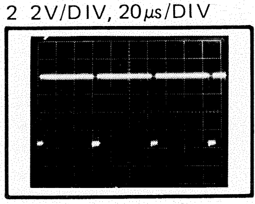
hode
hode
ode

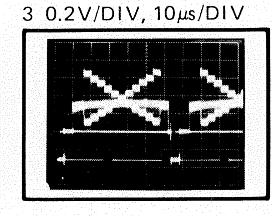
Mother Board

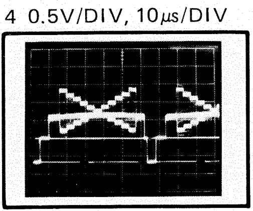
IC1	YFTC4011BF		C4
IC2	HD14053BFP		C3
IC3	NJM2903M		C3
IC4	TC4053BF		B2, C2
IC5	TC4053BF		C3
IC6	NJM4558M		A2
IC7	NJM4558M		A3
IC8	YFM5232L		B2
IC9	YFNJM723M		C2
IC10	YFTC4011BF		A3
Q1	2SD601-QRS	(Y)	D3
Q2	2SD601-QRS	(Y)	C3
Q3	2SD601-QRD	(Y)	C3
Q4	2SD602-QRS	(W)	D2
Q5	2SC2405STU	(S)	D2
Q6	2SD601-QRS	(Y)	B3
Q7	2SB709-QRS	(A)	C3
Q8	2SB709-QRS	(A)	C3
Q9	2SD602-QRS	(W)	D3
Q10	2SD602-QRS	(W)	C3
Q11	2SC2405STU	(S)	C3
Q12	2SB709-QRS	(Y)	D2
Q13	2SD602-QRS	(W)	D3
Q14	2SC2405STU	(S)	C3
Q15	2SD602-QRS	(W)	D3
Q16	2SC2405STU	(S)	D3
Q17	2SB793A-RST		C2
Q18	2SD973A-RS		C2
Q19	2SD601-QRS	(Y)	B4
Q20	2SD601-QRS	(Y)	A4
Q21	2SD601-QRS	(Y)	A4
Q22	2SB709-QRS	(A)	A3
Q23	2SB709-QRS	(A)	A3
Q24	2SD601-QRS	(Y)	A3
Q25	2SD601-QRS	(Y)	A3
Q26	2SD601-QRS	(Y)	A3
Q27	2SD601-QRS	(Y)	A3
Q28	2SB709-QRS	(A)	A3
Q29	2SD973A-RS		A2
Q30	2SB793A-RST		A2
Q31	2SD601-QRS	(Y)	B3
Q32	2SD601-QRS	(Y)	B2
D1	MA151A	(MA)	D2
D2	MA151A	(MA)	D2
D3	MA165		C3
D4	MA151A	(MA)	C3
D5	MA151A	(MA)	C3
D6	MA165		C3
D7	MA165		D4
D8	MA165		C4
D9	MA165		C4
D10	MA151A	(MA)	D3
D11	MA151A	(MA)	D2
D12	MA165		C2
D13	MA165		C2
D14	MA165		C2
D15	MA165		C2
D16	MA165		C2
D17	MA151A	(MA)	A4
D18	MA151A	(MA)	A4
D19	MA165		B3

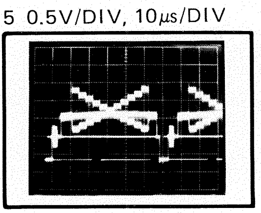
SIGNAL WAVEFORMS OF MOTHER BOARD

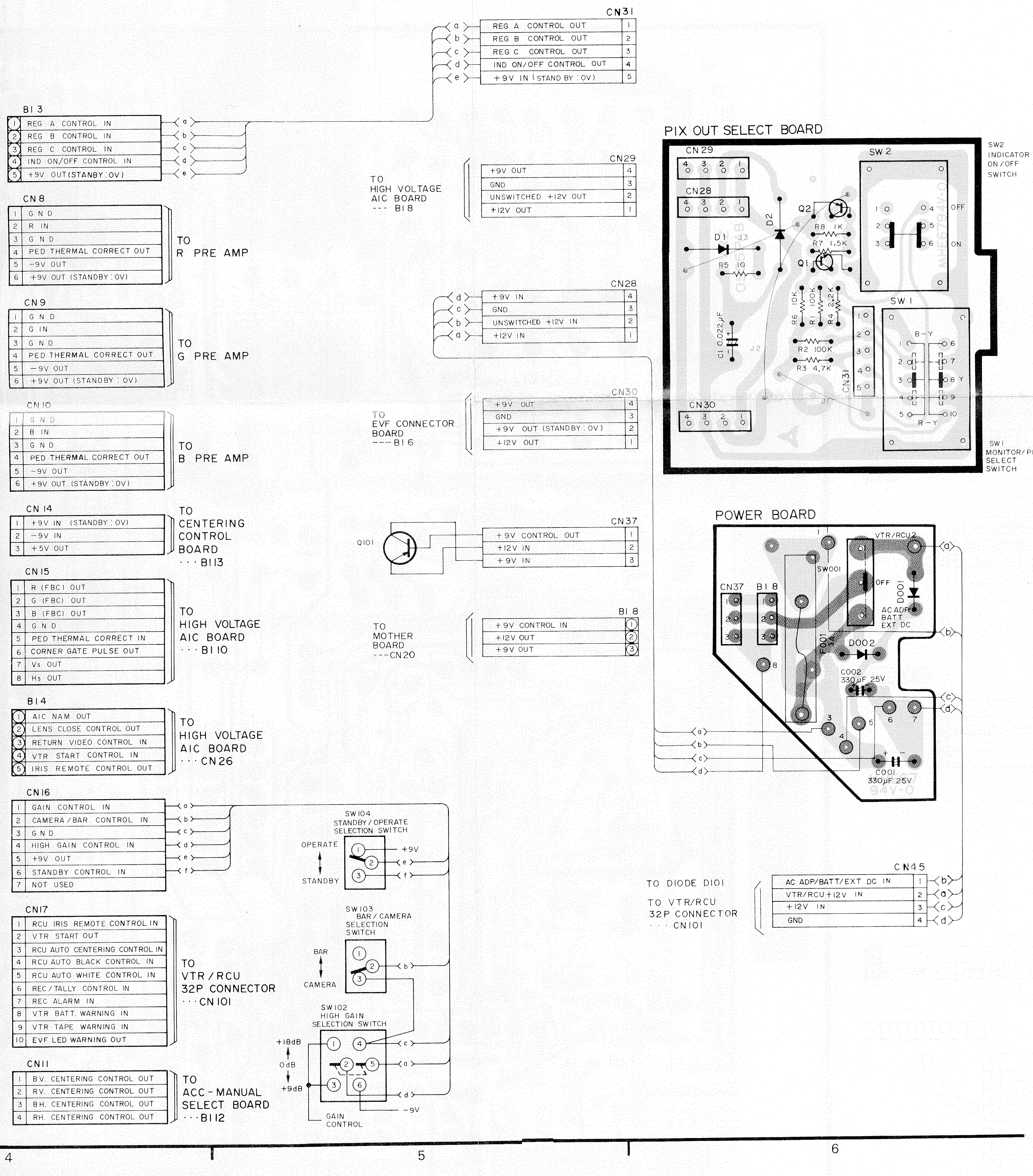

1 2V/DIV, 5ms/DIV


2 2V/DIV, 20μs/DIV


3 0.2V/DIV, 10μs/DIV


4 0.5V/DIV, 10μs/DIV


5 0.5V/DIV, 10μs/DIV


CN31
REG A CONTROL OUT 1
REG B CONTROL OUT 2
REG C CONTROL OUT 3
IND ON/OFF CONTROL OUT 4
+9V IN (STAND BY : 0V) 5
B13
1 REG A CONTROL IN
2 REG B CONTROL IN
3 REG C CONTROL IN
4 IND ON/OFF CONTROL IN
5 +9V OUT(STANBY : 0V)
a b c d e
CN8
1 GND
2 R IN
3 GND
4 PED THERMAL CORRECT OUT
5 -9V OUT
6 +9V OUT (STANDBY : 0V)
TO R PRE AMP
CN9
1 GND
2 G IN
3 GND
4 PED THERMAL CORRECT OUT
5 -9V OUT
6 +9V OUT (STANDBY : 0V)
TO G PRE AMP
CN10
1 GND
2 B IN
3 GND
4 PED THERMAL CORRECT OUT
5 -9V OUT
6 +9V OUT (STANDBY : 0V)
TO B PRE AMP
CN14
1 +9V IN (STANDBY : 0V)
2 -9V IN
3 +5V OUT
TO CENTERING CONTROL BOARD ··· B113
CN15
1 R (FBC) OUT
2 G (FBC) OUT
3 B (FBC) OUT
4 GND
5 PED THERMAL CORRECT IN
6 CORNER GATE PULSE OUT
7 Vs OUT
8 Hs OUT
TO HIGH VOLTAGE AIC BOARD ··· B110
B14
1 AIC NAM OUT
2 LENS CLOSE CONTROL OUT
3 RETURN VIDEO CONTROL IN
4 VTR START CONTROL IN
5 IRIS REMOTE CONTROL OUT
TO HIGH VOLTAGE AIC BOARD ··· CN26
CN16
1 GAIN CONTROL IN
2 CAMERA/BAR CONTROL IN
3 GND
4 HIGH GAIN CONTROL IN
5 +9V OUT
6 STANDBY CONTROL IN
7 NOT USED
CN17
1 RCU IRIS REMOTE CONTROL IN
2 VTR START OUT
3 RCU AUTO CENTERING CONTROL IN
4 RCU AUTO BLACK CONTROL IN
5 RCU AUTO WHITE CONTROL IN
6 REC/TALLY CONTROL IN
7 REC ALARM IN
8 VTR BATT. WARNING IN
9 VTR TAPE WARNING IN
10 EVF LED WARNING OUT
TO VTR/RCU 32P CONNECTOR ··· CN101
CN11
1 BV. CENTERING CONTROL OUT
2 RV. CENTERING CONTROL OUT
3 BH. CENTERING CONTROL OUT
4 RH. CENTERING CONTROL OUT
TO ACC-MANUAL SELECT BOARD ··· B112
SW104 STANDBY/OPERATE SELECTION SWITCH
OPERATE
STANDBY
+9V
SW103 BAR/CAMERA SELECTION SWITCH
BAR
CAMERA
SW102 HIGH GAIN SELECTION SWITCH
+18dB
0dB
+9dB
-9V
GAIN CONTROL
TO HIGH VOLTAGE AIC BOARD --- B18
CN29
+9V OUT 4
GND 3
UNSWITCHED +12V OUT 2
+12V OUT 1
CN28
+9V IN 4
GND 3
UNSWITCHED +12V IN 2
+12V IN 1
TO EVF CONNECTOR BOARD --- B16
CN30
+9V OUT 4
GND 3
+9V OUT (STANDBY : 0V) 2
+12V OUT 1
Q101
CN37
+9V CONTROL OUT 1
+12V IN 2
+9V IN 3
TO MOTHER BOARD --- CN20
B18
+9V CONTROL IN 1
+12V OUT 2
+9V OUT 3
PIX OUT SELECT BOARD
CN29
CN28
CN30
CN31
D1
D2
Q1
Q2
R8 1K
R7 1.5K
R5 10
R6 10K
R1 100K
R4 2.2K
R2 100K
R3 4.7K
C1 0.022μF
J1
J2
J3
SW2
OFF
ON
SW1
B-Y
R-Y
Y
SW2 INDICATOR ON/OFF SWITCH
SW1 MONITOR/PIX SELECT SWITCH
POWER BOARD
CN37
B18
SW001
VTR/RCU
OFF
D001
AC ADP/BATT EXT DC
F001
D002
C002 330μF 25V
C001 330μF 25V
94V-0
TO DIODE D101
TO VTR/RCU 32P CONNECTOR ··· CN101
CN45
AC ADP/BATT/EXT DC IN 1
VTR/RCU +12V IN 2
+12V IN 3
GND 4
4
5
6

Q14	2SC2405STU	(S)	C3
Q15	2SD602-QRS	(W)	D3
Q16	2SC2405STU	(S)	D3
Q17	2SB793A-RST		C2
Q18	2SD973A-RS		C2
Q19	2SD601-QRS	(Y)	B4
Q20	2SD601-QRS	(Y)	A4
Q21	2SD601-QRS	(Y)	A4
Q22	2SB709-QRS	(A)	A3
Q23	2SB709-QRS	(A)	A3
Q24	2SD601-QRS	(Y)	A3
Q25	2SD601-QRS	(Y)	A3
Q26	2SD601-QRS	(Y)	A3
Q27	2SD601-QRS	(Y)	A3
Q28	2SB709-QRS	(A)	A3
Q29	2SD973A-RS		A2
Q30	2SB793A-RST		A2
Q31	2SD601-QRS	(Y)	B3
Q32	2SD601-QRS	(Y)	B2
D1	MA151A	(MA)	D2
D2	MA151A	(MA)	D2
D3	MA165		C3
D4	MA151A	(MA)	C3
D5	MA151A	(MA)	C3
D6	MA165		C3
D7	MA165		D4
D8	MA165		C4
D9	MA165		C4
D10	MA151A	(MA)	D3
D11	MA151A	(MA)	D2
D12	MA165		C2
D13	MA165		C2
D14	MA165		C2
D15	MA165		C2
D16	MA165		C2
D17	MA151A	(MA)	A4
D18	MA151A	(MA)	A4
D19	MA165		B3

SCHEMATIC DIAGRAM OF MOTHER BOARD

Pre-Preampier Board

			S/D
Q1	2SK197YDE	(YC)	C1

Preamplifier Boarder

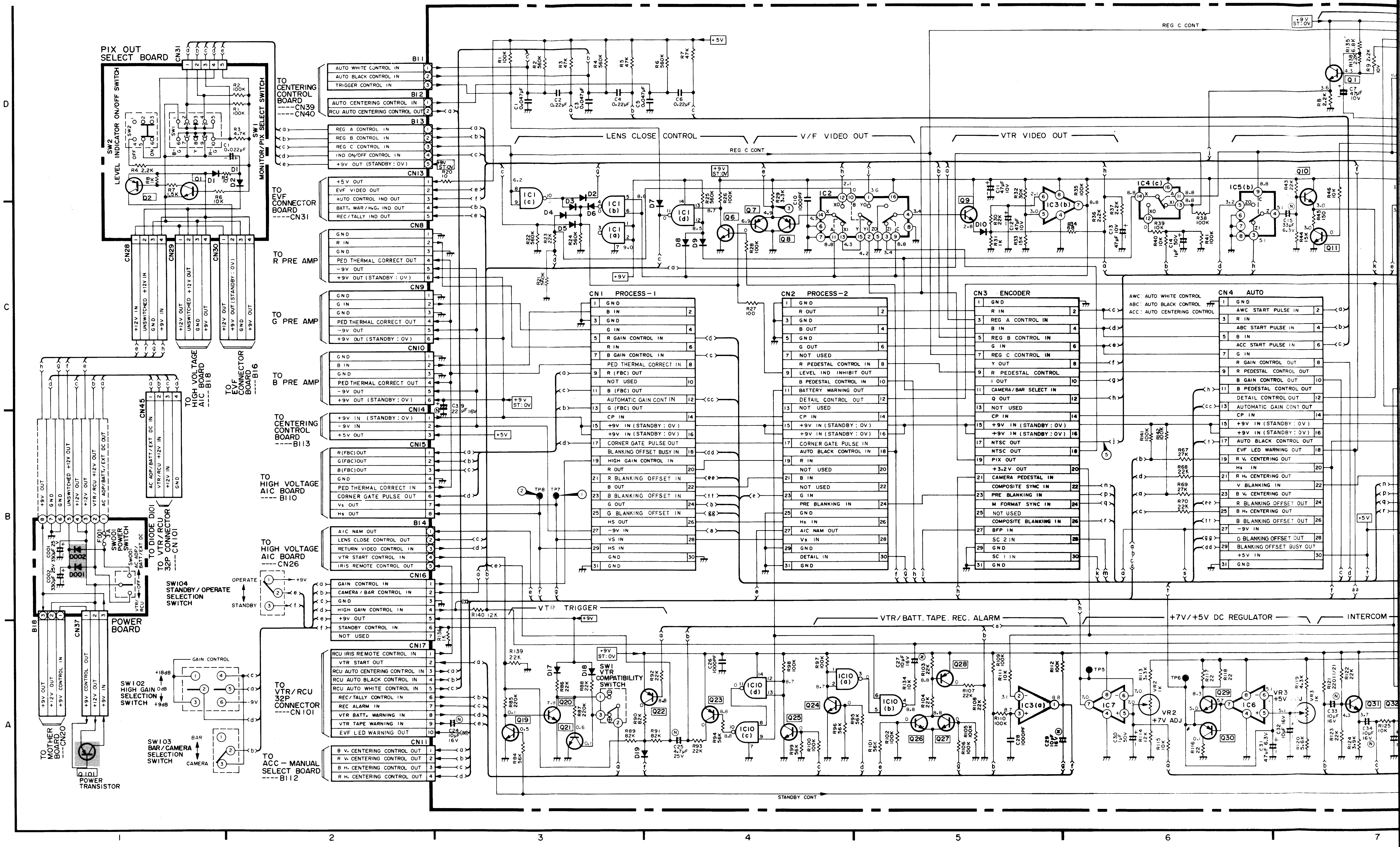
IC1	AN608P		B2
Q1	2SA1254-BC		C1

Mother Board

IC1	TC4011BF		C3
IC2	HD14053BFP		C4
IC3	NJM2903M		C5
IC4	TC4053BF		C6, D7, D8
IC5	TC4053BF		C6, C7, C8
IC6	NJM4558M		A6
IC7	NJM4558M		A6
IC8	M5232L		A8
IC9	NJM723M		A8
IC10	TC4011BF		A4, A5
Q1	2SD601-QRS	(Y)	D7
Q2	2SD601-QRS	(Y)	D8
Q3	2SD601-QRD	(Y)	D8
Q4	2SD602-QRS	(W)	D8
Q5	2SC2405STU	(S)	D9
Q6	2SD601-QRS	(Y)	C4
Q7	2SB709-QRS	(A)	C4
Q8	2SB709-QRS	(A)	C4
Q9	2SD602-QRS	(W)	C5
Q10	2SD602-QRS	(W)	C7
Q11	2SC2405STU	(S)	C7
Q12	2SB709-QRS	(Y)	C9
Q13	2SD602-QRS	(W)	C7
Q14	2SC2405STU	(S)	C8
Q15	2SD602-QRS	(W)	C8
Q16	2SC2405STU	(S)	C8
Q17	2SB793A-RST		A8
Q18	2SD973A-RS		A8
Q19	2SD601-QRS	(Y)	A3
Q20	2SD601-QRS	(Y)	A3
Q21	2SD601-QRS	(Y)	A3
Q22	2SB709-QRS	(A)	A4
Q23	2SB709-QRS	(A)	A4
Q24	2SD601-QRS	(Y)	A4
Q25	2SD601-QRS	(Y)	A4
Q26	2SD601-QRS	(Y)	A5
Q27	2SD601-QRS	(Y)	A5
Q28	2SB709-QRS	(A)	A5
Q29	2SD973A-RS		A6
Q30	2SB793A-RST		A6
Q31	2SD601-QRS	(Y)	A7
Q32	2SD601-QRS	(Y)	A7
D1	MA151A	(MA)	D8
D2	MA151A	(MA)	C3
D3	MA165		C3
D4	MA151A	(MA)	C3
D5	MA151A	(MA)	C3
D6	MA165		C3
D7	MA165		C4
D8	MA165		C4
D9	MA165		C4
D10	MA151A	(MA)	C5
D11	MA151A	(MA)	C8
D12	MA165		A8
D13	MA165		A8
D14	MA165		A8
D15	MA165		A9
D16	MA165		A9
D17	MA151A	(MA)	A3
D18	MA151A	(MA)	A3
D19	MA165		A3

Process 1 Board

IC1	AN610P		C4
IC2	AN610P		B4, C4
IC3	AN610P		B4
IC4	TC4053BF		B7
IC5	NJM4558M		A4, A5
Q1	2SC2405STU	(S)	C2
Q2	2SC2404-CD	(U)	C3
Q3	2SC2404-CD	(U)	C3
Q4	2SC2405STU	(S)	C3
Q5	2SC2404-CD	(U)	C3
Q6	2SC2405STU	(S)	C3
Q7	2SB709-QRS	(A)	C4

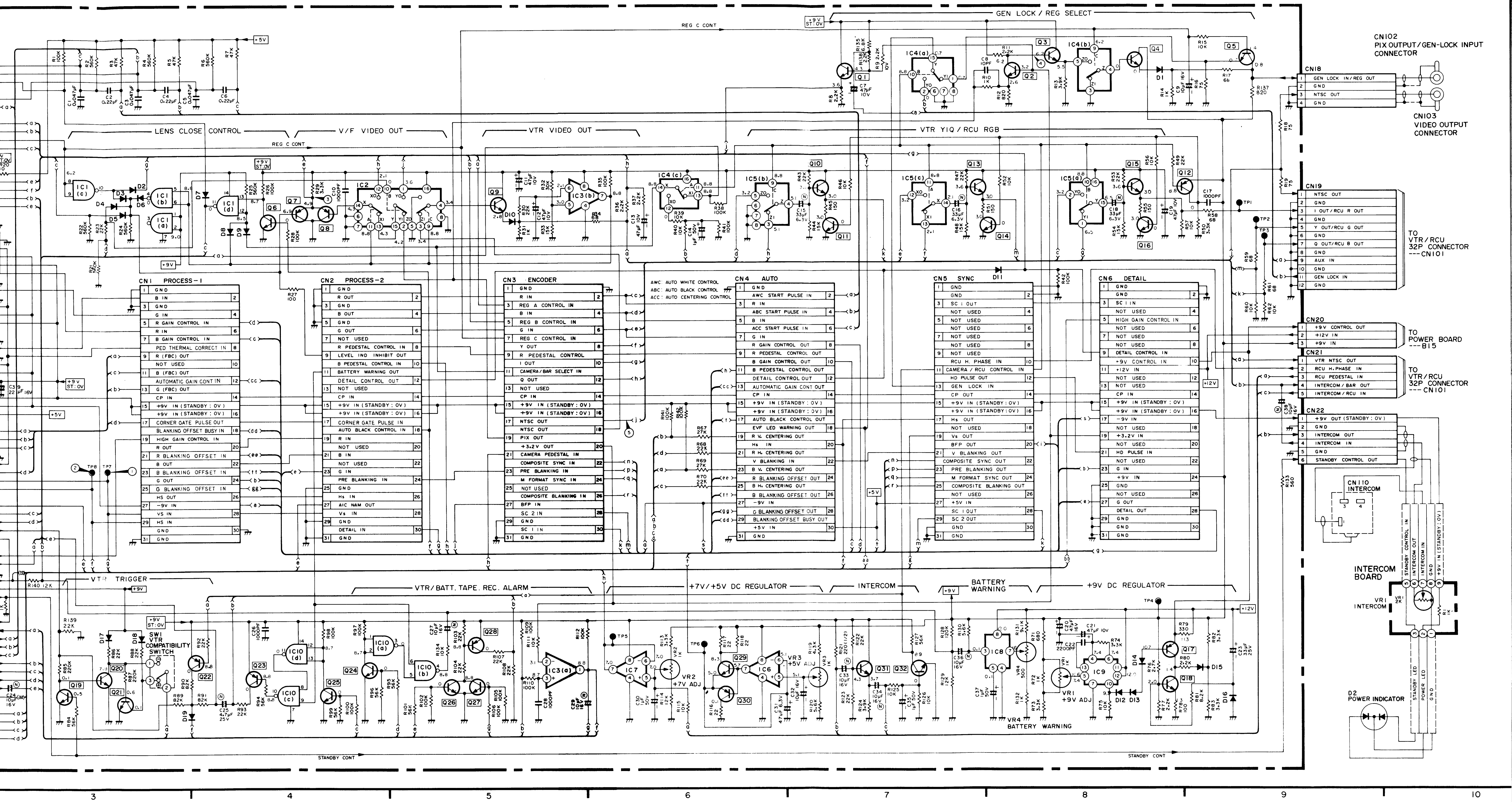


D
C
B
A
1
2
3
4
5
6
7
PIX OUT SELECT BOARD
SW2 LEVEL INDICATOR ON/OFF SWITCH
SW1 MONITOR/PIX SELECT SWITCH
CN31
CN28
CN29
CN30
CN45
TO HIGH VOLTAGE AIC BOARD ---B18
TO EVF CONNECTOR BOARD ---B16
TO DIODE D101
TO VTR/RCU 32P CONNECTOR ---CN101
SW001 POWER SWITCH
D001
D002
POWER BOARD
B18
CN37
TO MOTHER BOARD ---CN20
Q101 POWER TRANSISTOR
TO CENTERING CONTROL BOARD ---CN39 ---CN40
TO EVF CONNECTOR BOARD ---CN31
TO R PRE AMP
TO G PRE AMP
TO B PRE AMP
TO CENTERING CONTROL BOARD ---B113
TO HIGH VOLTAGE AIC BOARD ---B110
TO HIGH VOLTAGE AIC BOARD ---CN26
SW104 STANDBY/OPERATE SELECTION SWITCH
OPERATE
STANDBY
SW102 HIGH GAIN SELECTION SWITCH
GAIN CONTROL
+18dB
0dB
+9dB
SW103 BAR/CAMERA SELECTION SWITCH
BAR
CAMERA
TO VTR/RCU 32P CONNECTOR ---CN101
TO ACC – MANUAL SELECT BOARD ---B112
B11
AUTO WHITE CONTROL IN
AUTO BLACK CONTROL IN
TRIGGER CONTROL IN
B12
AUTO CENTERING CONTROL IN
RCU AUTO CENTERING CONTROL OUT
B13
REG A CONTROL IN
REG B CONTROL IN
REG C CONTROL IN
IND ON/OFF CONTROL IN
+9V OUT (STANDBY : OV)
CN13
+5V OUT
EVF VIDEO OUT
AUTO CONTROL IND OUT
BATT. WAR/H.G. IND OUT
REC/TALLY IND OUT
CN8
GND
R IN
PED THERMAL CORRECT OUT
–9V OUT
+9V OUT (STANDBY : OV)
CN9
G IN
CN10
B IN
CN14
+9V IN (STANDBY : OV)
–9V IN
+5V OUT
CN15
R(FBC) OUT
G(FBC) OUT
B(FBC) OUT
PED THERMAL CORRECT IN
CORNER GATE PULSE OUT
Vs OUT
Hs OUT
B14
AIC NAM OUT
LENS CLOSE CONTROL OUT
RETURN VIDEO CONTROL IN
VTR START CONTROL IN
IRIS REMOTE CONTROL IN
CN16
GAIN CONTROL IN
CAMERA/BAR CONTROL IN
HIGH GAIN CONTROL IN
+9V OUT
STANDBY CONTROL IN
NOT USED
CN17
RCU IRIS REMOTE CONTROL IN
VTR START OUT
RCU AUTO CENTERING CONTROL IN
RCU AUTO BLACK CONTROL IN
RCU AUTO WHITE CONTROL IN
REC/TALLY CONTROL IN
REC ALARM IN
VTR BATT. WARNING IN
VTR TAPE WARNING IN
EVF LED WARNING OUT
CN11
B Vc CENTERING CONTROL OUT
R Vc CENTERING CONTROL OUT
B Hc CENTERING CONTROL OUT
R Hc CENTERING CONTROL OUT
LENS CLOSE CONTROL
V/F VIDEO OUT
VTR VIDEO OUT
REG C CONT
CN1 PROCESS-1
CN2 PROCESS-2
CN3 ENCODER
CN4 AUTO
AWC: AUTO WHITE CONTROL
ABC: AUTO BLACK CONTROL
ACC: AUTO CENTERING CONTROL
VTR TRIGGER
SW1 VTR COMPATIBILITY SWITCH
VTR/BATT. TAPE. REC. ALARM
+7V/+5V DC REGULATOR
INTERCOM
VR2 +7V ADJ
VR3
STANDBY CONT
TP6
TP7
TP8
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC10
Q1
Q2
Q6
Q7
Q8
Q9
Q10
Q11
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X Radiation, fire and electrical shock hazards When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic

SCHEMATIC DIAGRAM OF MOTHER BOARD


GEN LOCK / REG SELECT
REG C CONT
LENS CLOSE CONTROL
V/F VIDEO OUT
VTR VIDEO OUT
VTR YIQ / RCU RGB
VTR TRIGGER
VTR/BATT. TAPE. REC. ALARM
+7V/+5V DC REGULATOR
INTERCOM
BATTERY WARNING
+9V DC REGULATOR
STANDBY CONT
SW1 VTR COMPATIBILITY SWITCH
VR1 +9V ADJ
VR2 +7V ADJ
VR3 +5V ADJ
VR4 BATTERY WARNING
CN102 PIX OUTPUT/GEN-LOCK INPUT CONNECTOR
CN103 VIDEO OUTPUT CONNECTOR
CN18
1 GEN LOCK IN/REG OUT
2 GND
3 NTSC OUT
4 GND
CN19
1 NTSC OUT
2 GND
3 I OUT/RCU R OUT
4 GND
5 Y OUT/RCU G OUT
6 GND
7 Q OUT/RCU B OUT
8 GND
9 AUX IN
10 GND
11 GEN LOCK IN
12 GND
TO VTR/RCU 32P CONNECTOR ---CN101
CN20
1 +9V CONTROL OUT
2 +12V IN
3 +9V IN
TO POWER BOARD ---B15
CN21
1 VTR NTSC OUT
2 RCU H. PHASE IN
3 RCU PEDESTAL IN
4 INTERCOM/BAR OUT
5 INTERCOM/RCU IN
TO VTR/RCU 32P CONNECTOR ---CN101
CN22
1 +9V OUT (STANDBY: OV)
2 GND
3 INTERCOM OUT
4 INTERCOM IN
5 GND
6 STANDBY CONTROL OUT
CN110 INTERCOM
INTERCOM BOARD
VR1 INTERCOM
D2 POWER INDICATOR
STANDBY CONTROL IN
INTERCOM OUT
INTERCOM IN
GND
+9V IN (STANDBY: OV)
STANDBY LED
POWER LED
CN1 PROCESS-1
1 GND
2 B IN
3 GND
4 G IN
5 R GAIN CONTROL IN
6 R IN
7 B GAIN CONTROL IN
8 PED THERMAL CORRECT IN
9 R (FBC) OUT
10 NOT USED
11 B (FBC) OUT
12 AUTOMATIC GAIN CONT IN
13 G (FBC) OUT
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 CORNER GATE PULSE OUT
18 BLANKING OFFSET BUSY IN
19 HIGH GAIN CONTROL IN
20 R OUT
21 R BLANKING OFFSET IN
22 B OUT
23 B BLANKING OFFSET IN
24 G OUT
25 G BLANKING OFFSET IN
26 HS OUT
27 -9V IN
28 VS IN
29 HS IN
30 GND
31 GND
CN2 PROCESS-2
1 GND
2 R OUT
3 GND
4 B OUT
5 GND
6 G OUT
7 NOT USED
8 R PEDESTAL CONTROL IN
9 LEVEL IND INHIBIT OUT
10 B PEDESTAL CONTROL IN
11 BATTERY WARNING OUT
12 DETAIL CONTROL OUT
13 NOT USED
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 CORNER GATE PULSE IN
18 AUTO BLACK CONTROL IN
19 R IN
20 NOT USED
21 B IN
22 NOT USED
23 G IN
24 PRE BLANKING IN
25 GND
26 Hs IN
27 AIC NAM OUT
28 Vs IN
29 GND
30 DETAIL IN
31 GND
CN3 ENCODER
1 GND
2 R IN
3 REG A CONTROL IN
4 B IN
5 REG B CONTROL IN
6 G IN
7 REG C CONTROL IN
8 Y OUT
9 R PEDESTAL CONTROL
10 I OUT
11 CAMERA/BAR SELECT IN
12 Q OUT
13 NOT USED
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 NTSC OUT
18 NTSC OUT
19 PIX OUT
20 +3.2V OUT
21 CAMERA PEDESTAL IN
22 COMPOSITE SYNC IN
23 PRE BLANKING IN
24 M FORMAT SYNC IN
25 NOT USED
26 COMPOSITE BLANKING IN
27 BFP IN
28 SC 2 IN
29 GND
30 SC 1 IN
31 GND
AWC: AUTO WHITE CONTROL
ABC: AUTO BLACK CONTROL
ACC: AUTO CENTERING CONTROL
CN4 AUTO
1 GND
2 AWC START PULSE IN
3 R IN
4 ABC START PULSE IN
5 B IN
6 ACC START PULSE IN
7 G IN
8 R GAIN CONTROL OUT
9 R PEDESTAL CONTROL OUT
10 B GAIN CONTROL OUT
11 B PEDESTAL CONTROL OUT
12 DETAIL CONTROL OUT
13 AUTOMATIC GAIN CONT OUT
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 AUTO BLACK CONTROL OUT
18 EVF LED WARNING OUT
19 R V. CENTERING OUT
20 Hs IN
21 R H. CENTERING OUT
22 V BLANKING IN
23 B V. CENTERING OUT
24 R BLANKING OFFSET OUT
25 B H. CENTERING OUT
26 B BLANKING OFFSET OUT
27 -9V IN
28 G BLANKING OFFSET OUT
29 BLANKING OFFSET BUSY OUT
30 +5V IN
31 GND
CN5 SYNC
1 GND
2 GND
3 SC I OUT
4 NOT USED
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 RCU H. PHASE IN
11 CAMERA/RCU CONTROL IN
12 HD PULSE OUT
13 GEN LOCK IN
14 CP OUT
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 Hs OUT
18 NOT USED
19 Vs OUT
20 BFP OUT
21 V BLANKING OUT
22 COMPOSITE SYNC OUT
23 PRE BLANKING OUT
24 M FORMAT SYNC OUT
25 COMPOSITE BLANKING OUT
26 NOT USED
27 +5V IN
28 SC I OUT
29 SC 2 OUT
30 GND
31 GND
CN6 DETAIL
1 GND
2 GND
3 SC I IN
4 NOT USED
5 HIGH GAIN CONTROL IN
6 NOT USED
7 NOT USED
8 NOT USED
9 DETAIL CONTROL IN
10 +9V CONTROL IN
11 +12V IN
12 NOT USED
13 NOT USED
14 CP IN
15 +9V IN (STANDBY: OV)
16 +9V IN (STANDBY: OV)
17 -9V IN
18 NOT USED
19 +3.2V IN
20 NOT USED
21 HD PULSE IN
22 NOT USED
23 G IN
24 +9V IN
25 GND
26 NOT USED
27 G OUT
28 DETAIL OUT
29 GND
30 GND
31 GND
IC1 IC2 IC3 IC4 IC5 IC6 IC7 IC8 IC9 IC10
TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8
+5V +9V +12V +9V ST: OV
3
4
5
6
7
8
9
10

EXPLODED VIEW OF CAMERA (WV-N3)

Vol.4

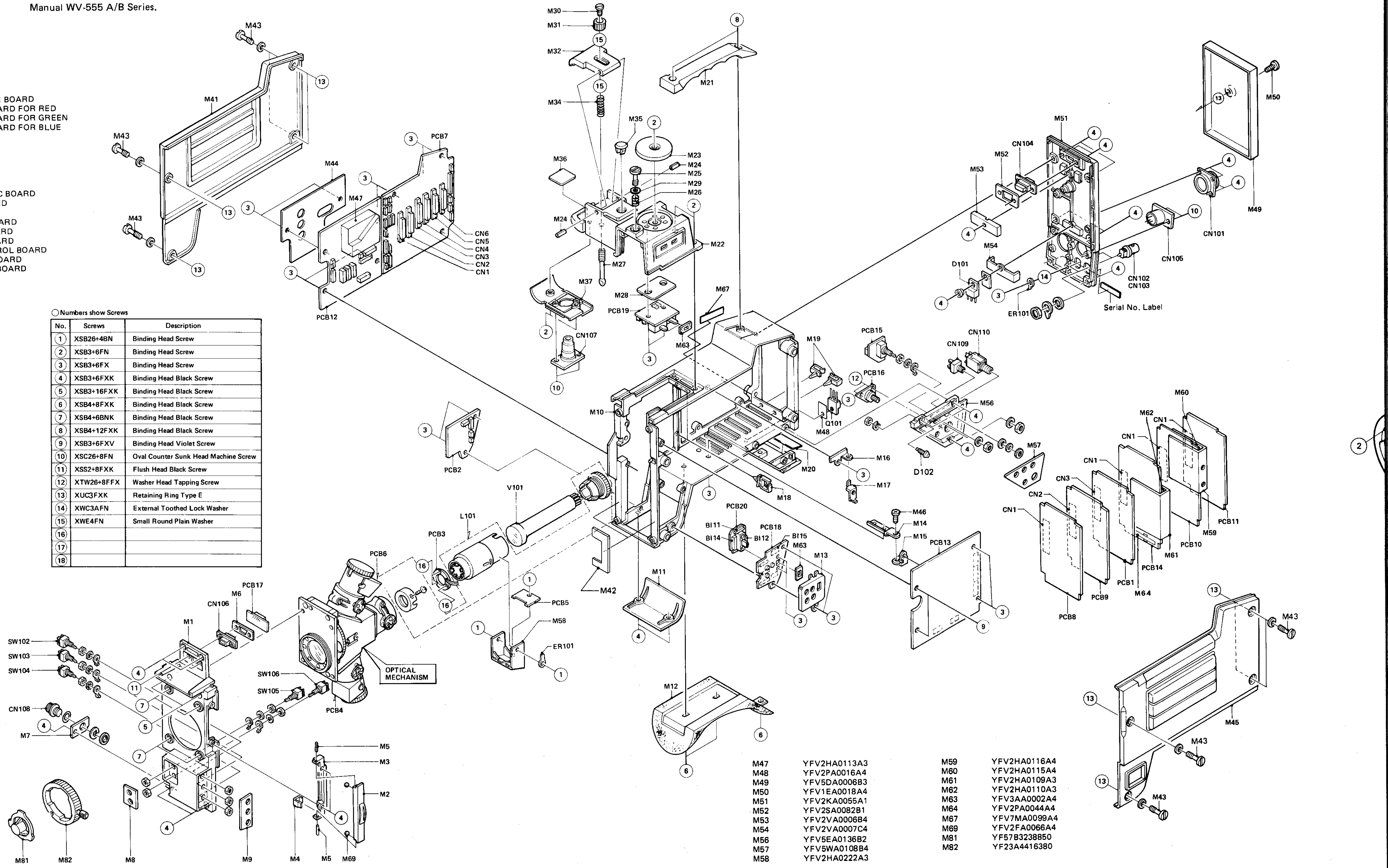
This Service Manual contains only defferent portion from Original Service Manual WV-555 Series, Suppliment-1 Service Manual WV-555 Series, Suppliment-4 Service Manual WV-555 Series and Original Service Manual WV-555 A/B Series.

PCB1	ENCODER BOARD
PCB2	MIC BOARD
PCB3	PRE-PREAMPLIFIER BOARD
PCB4	PREAMPLIFIER BOARD FOR RED
PCB5	PREAMPLIFIER BOARD FOR GREEN
PCB6	PREAMPLIFIER BOARD FOR BLUE
PCB7	MOTHER BOARD
CN1-6	YFD531STDS
PCB8	PROCESS-1 BOARD
PCB9	PROCESS-2 BOARD
PCB10	SYNC BOARD
PCB11	DETAIL BOARD
PCB12	HIGH VOLTAGE AIC BOARD
PCB13	DEFLECTION BOARD
PCB14	AUTO BOARD
PCB15	POWER SWITCH BOARD
PCB16	INTERCOM VR BOARD
PCB17	EVF CONTROL BOARD
PCB18	CENTERING CONTROL BOARD
PCB19	PIX OUT SELECT BOARD
PCB20	ACC-MAN SELECT BOARD

V101-103	S4701
Q101	2SA1061P
D101	ESAB82-004
D102	BD607RG
L101	YFVAKA0328AN
SW102	YFM2023ESG
SW103	YFM2012LSG
SW104	YFM2012ES
SW105	YFM2015LSG
SW106	YFM2018ESG
CN101	YFJMR2532M
CN102,103	YWBNC-R
CN104	YFDEC9PF0
CN105	YFXLR4-32
CN107	YFFM16R03H
CN108	YFR03R8F3CN109
CN109	YW-SJ296
CN110	YWLJ145-1A
ER101	3LUG
M1	YFV2KA0054A1
M2	YFV5EA0140A3
M3	YFV5KA0031B3
M4	YFV4JA0055A4
M5	YFXPL16A8WV
M6	YFV2SA0036A4
M7	YFV5WA0057A4
M8	YFV5WA0105A4
M9	YFV5WB0106A4
M10	YFV2KB0053AS
M11	YFV5EA0138A3
M12	YFV5VA0021A2
M13	YFV5WA0107A4
M14	YFV2SA0034A4
M15	YFV2SA0031B4
M16	YFV2SA0079A4
M17	YFV2SA0081A4
M18	YFLWS25S
M19	YFS10
M20	YFV7QA0696A4
M21	YFV6AA0008A3
M22	YFV5WA0115CS
M23	YFV5EB0044A4
M24	YFXPL25A10WV
M25	YFV1EA0007A4
M26	YFV4JA0020A4
M27	YFV1EA0027A4
M28	YFV2PA0047A4
M29	YFV1KA0005A4
M30	YFV1EA0026A4
M31	YFV1FA0007A4
M32	YFV6FB0021A2
M34	YFV4JA0058A4
M35	YFH0LEPLUG10
M36	YFV5VA0022A4
M37	YFV5DB0013A2
M38	YVZC700RB50
M41	YFV5EF0135A1
M42	YFV4JA0078A4
M43	YFV1EB0023A4
M44	YFV2PA0045A4
M45	YFV5EF0134AS
M46	YWV52-BM01

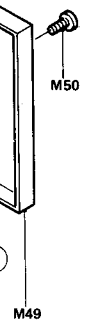
○Numbers show Screws

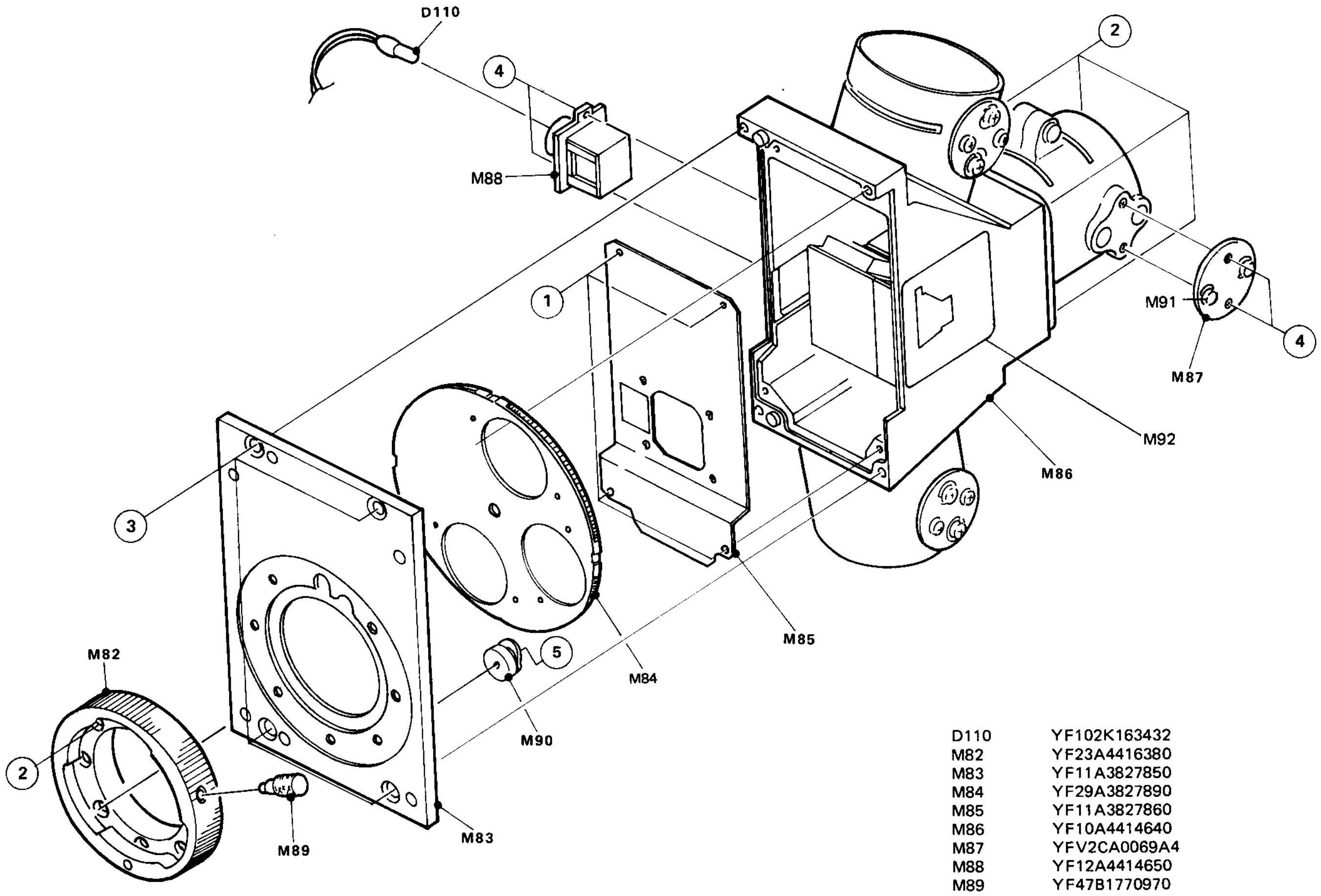
No.	Screws	Description
①	XSB26+4BN	Binding Head Screw
②	XSB3+6FN	Binding Head Screw
③	XSB3+6FX	Binding Head Screw
④	XSB3+6FXK	Binding Head Black Screw
⑤	XSB3+16FXK	Binding Head Black Screw
⑥	XSB4+8FXK	Binding Head Black Screw
⑦	XSB4+6BNK	Binding Head Black Screw
⑧	XSB4+12FXK	Binding Head Black Screw
⑨	XSB3+6FXV	Binding Head Violet Screw
⑩	XSC26+8FN	Oval Counter Sunk Head Machine Screw
⑪	XSS2+8FXK	Flush Head Black Screw
⑫	XTW26+8FFX	Washer Head Tapping Screw
⑬	XUC3FXK	Retaining Ring Type E
⑭	XWC3AFN	External Toothed Lock Washer
⑮	XWE4FN	Small Round Plain Washer
⑯		
⑰		
⑱		


M43
M41
M43
M43
⑬
M44
M47
PCB7
PCB12
CN6
CN5
CN4
CN3
CN2
CN1
③
M30
M31
M32
M34
M35
M36
M23
M24
M25
M29
M26
M22
M24
M27
M37
M28
PCB19
M63
M67
CN107
⑮
⑧
M21
⑩
②
M50
M49
M51
CN104
M52
M53
M54
D101
ER101
CN101
CN105
CN102
CN103
Serial No. Label
④
⑭
PCB15
CN110
CN109
SW1
M19
PCB16
⑫
Q101
M48
M56
M16
M17
D102
M57
M60
M62
CN1
CN1
CN1
CN3
CN2
CN1
PCB11
M59
PCB10
M61
PCB14
PCB1
M64
PCB9
PCB8
M10
M20
M18
PCB20
BI11
BI14
BI12
PCB18
BI15
M63
M13
M46
M14
M15
PCB13
⑨
PCB2
V101
L101
PCB3
PCB6
⑯
M42
M11
PCB5
M58
ER101
①
⑥
M12
M45
M43
M43
M43
PCB17
M6
CN106
M1
OPTICAL MECHANISM
SW106
SW105
PCB4
SW102
SW103
SW104
CN108
M7
⑪
⑦
⑤
M5
M3
M2
M81
M82
M8
M9
M4
M5
M69

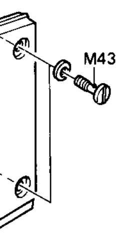
M47	YFV2HA0113A3
M48	YFV2PA0016A4
M49	YFV5DA0006B3
M50	YFV1EA0018A4
M51	YFV2KA0055A1
M52	YFV2SA0082B1
M53	YFV2VA0006B4
M54	YFV2VA0007C4
M56	YFV5EA0136B2
M57	YFV5WA0108B4
M58	YFV2HA0222A3
M59	YFV2HA0116A4
M60	YFV2HA0115A4
M61	YFV2HA0109A3
M62	YFV2HA0110A3
M63	YFV3AA0002A4
M64	YFV2PA0044A4
M67	YFV7MA0099A4
M69	YFV2FA0066A4
M81	YF57B3238850
M82	YF23A4416380

EXPLODED VIEW OF OPTICAL MECHANIMS




D110
4
M88
2
1
M91
4
M87
M92
M86
3
M85
M84
5
M90
M82
2
M89
M83

D110	YF102K163432
M82	YF23A4416380
M83	YF11A3827850
M84	YF29A3827890
M85	YF11A3827860
M86	YF10A4414640
M87	YFV2CA0069A4
M88	YF12A4414650
M89	YF47B1770970
M90	YF30B3244350
M91	YFV1HA0017A4
M92	YFV7SA0215A4



○ **Number show scyews**

No.	Screw	Description
①	XSS2+3BN	Flush Head Machine Screws
②	XSS3+5BN	Flush Head Machine Screws
③	XSS3+8BN	Flush Head Machine Screws
④	XSN2+4BN	Pan Head Machine Screws
⑤	XSS2+8BN	Flush Head Machine Screws

Important Notice

REPLACEMENT PARTS LIST

1. Components identified by ⚠ mark have special characteritics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by o mark are new parts used from this model.
3. Complete printed circuit board assembly is not available as replacement part.

WV-N3 MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V101-103	S4701	Pick-up Tube
Q101 ⚠	2SA1061-P	Transistor
D101 ⚠	ESAB82-004	Diode
D102 ⚠	BD607RG	Diode
R101,102	ERD10TJ750	Carbon 75 ohms 1/8W
C101	ECQV05104JZ	Plastic 0.1 μF 50V
L101	ELY13A303A	Coil Assy
SW102	YFM2023ESG	Gain Selection Switch
SW103	YFM2012LSG	Bar/Camera Selection Switch
SW104	YFM2012ES	Standby/Operate Selection Switch
SW105	YFM2015LSG	Auto Centering Switch
SW106	YFM2018ESG	AWC Hold/ABC Selection Switch
CN101	YFJMR2532M	RCU/VTR Connector
CN102,103	YWBNC-R	BNC Connector
CN104	YFDEC9PF0	AC ADP/BAT Connector
CN105	YFXLR4-32	EXT DC 4 pin Connector
CN107	YFFM16R03H	Mic 3 pin Connector
CN108	YFR03R8F3	Lens 8 pin connector
CN109	YW-SJ296	Audio Monitor Jack
CN110	YWLJ145-1A	Intercom Jack
ER101	3 LUG	Ground Lug
M1	o YFV2KA0054A1	Front Chassis
M2	o YFV5EA0140A3	Filter Cover
M3	YFV5KA0031B3	Filter Base
M4	YFV4JA0055A4	Filter Spring Plate
M5	YFXPL16A8WV	Spring Pin (x2)
M6	YFV2SA0036A4	Mounting Angle for VF Connector
M7	YFV5WA0057A4	Mounting Angle for Lens Connector
M8	YFV5WA0105A4	Auto Centering Panel
M9	YFV5WB0106A4	Operation Switch Panel
M10	o YFV2KB0053BS	Main Chassis Assy
M11	o YFV5EA0138A3	Bottom Cover
M12	o YFV5VA0021A2	Shoulder Pad
M13	o YFV5WA0107A4	Centering Switch Panel
M14	o YFV2SA0034A4	Mounting Angle B for Board
M15	o YFV2SA0031B4	Mounting Angle C for Board
M16	o YFV2SA0079A4	Mounting Angle D for Board
M18	YFLWS25S	Cord Clamp A (x2)
M19	YFS10	Cord Clamp B (x2)
M20 ⚠	o YFV7QA0696A4	Main Label
M21	o YFV6AA0008A3	Handle
M22	o YFV5WA0115CS	Upper Cover Assy
M23	YFV5EB0044A4	Mounting Base for 5 Monitor
M24	YFXPL25A10WV	Mic Cover Pin (x2)
M25	YFV1EA0007A4	VF Mounting Screw
M26	YFV4JA0020A4	VF Mounting Coil Spring
M27	YFV1EA0027A4	Mic Support
M28	YFV2PA0047A4	Insulator Plate for Upper Cover
M29	YFV1KA0005A4	VF Washer

SYMBOL NO.	PART NO.	DESCRIPTION
M30	YFV1EA0026A4	Stopper Screw A
M31	YFV1FA0007A4	Mounting Nut for Mic
M32	YFV6FB0021A2	Mounting Cover for Mic
M34	YFV4JA0058A4	Mounting Spring for Mic
M35	YFHOLEPLUG10	Hole Plug
M36	YFV5VA0022A4	Mic Pad
M37	o YFV5DB0013A2	Mounting Plate for Mic Connector
M41	o YFV5EF0135A1	Left Side Cover
M42	o YFV4JA0078A4	Spring Plate
M43	o YFV1EB0023A4	Stopper Screw C for Cover (x2)
M44	o YFV2PA0045A4	High Voltage Insulator Plate
M45	o YFV5EF0134AS	Right Side Cover Assy
M46	YWV52-BM01	Lock Screw
M48	YFV2PA0016A4	Insulator Paper for Transistor
M49	YFV5DA0006B3	Rear Cover
M50	YFV1EA0018A4	Decoration Screw for Rear Cover
M51	YFV2KA0055B1	Rear Chassis
M52	YFV2SA0082A4	Mounting Plate for AC Adaptor Connector
M53	o YFV2VA0006B4	Blank cover for Slider
M54	o YFV2VA0007C4	Guide Blank Plate
M56	o YFV5EA0136B2	Poewr Operation cover
M57	o YFV5WA0108B4	Power Operation Panel
M58	YFV2HA0222A3	Shield Cover for Preamplifier Board
M67 ⚠	o YFV7MA0099A4	UL Caution Label
M69	YFV2FA0066A4	Filter Cover Cushion (x2)
M81	o YF57B3238850	Bayonet Mounting Cap
M82	o YF23A4416380	Bayonet Mounting

YFTV376B-2 OPTICAL MECHANISM.

SYMBOL NO.	PART NO.	DESCRIPTION
D110	YF102K163432	LED
M82	o YF23A4416380	Bayonet Mounting
M83	o YF11A3827850	Front Filter Wheel
M84	YF29A3827890	Filter Whel
M85	o YF11A3827860	Rear Cover
M86	o YF10A4414640	Coil Housing Assy
M87	YFV2CA0069A4	Adjustment Plate Assy
M88	o YF12A4414650	Bias Light Housing
M89	YF47B1770970	Bayonet Mounting Lever
M90	YF30B3244350	Guide Roller
M91	o YFV1HA0017A4	Adjustment Pin
M92	o YFV7SA0215A4	Voltage Label

PRE-PREAMPLIFIER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB3	YFVKY555NP3A	Printed Circuit Board Assy	
Q1	2SK197YDF	Transistor	
R1	ERD25TJ225	Carbon	2.2M ohms 1/4W
R2	ERD25FJ105	Carbon	1M ohms 1/4W
C1,2	YF426104FZS	Ceramic	0.1 μF 50V

PREAMPLIFIER BOARD FOR RED

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB4	o YFVKY555NP4A	Printed Circuit Board Assy	
IC1	AN608P	IC	
Q1	2SA1254-BC	Transistor	
R1	ERJ8GCSG681	Carbon	680 ohms 1/8W
R2	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R3,4	ERJ8GCSG153	Carbon	15K ohms 1/8W
R5	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R6	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R7	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R8	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R9	ERJ8GCSJ100	Carbon	10 ohms 1/8W
C1	ECSF1AE226	Electrolytic	22 μF 10V
C2	ECSF1CE156	Electrolytic	15 μF 16V
C3	ECSF1AE226	Electrolytic	22 μF 10V
C4	ECSF1EE475	Electrolytic	4.7 μF 25V
CT1	ECRGB025E11	Trimmer	25 pF

PREAMPLIFIER BOARD FOR GREEN

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB5	YFVKY555NP5A	Printed Circuit Board Assy for Green	
PCB6	YFVKY555NP6A	Printed Circuit Board Assy for Blue	
IC1	AN608P	IC	
Q1	2SA1254-BC	Transistor	
R1	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R2	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R3, 4	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R5	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R6	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R7	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R8	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R9	ERJ8GCSJ100	Carbon	10 ohms 1/8W
C1	ECSF1AE226	Electrolytic	22 μF 10V
C2	ECSF1CE156	Electrolytic	15 μF 16V
C3	ECSF1AE226	Electrolytic	22 μF 10V
C4	ECSF1EE475	Electrolytic	4.7 μF 25V
CT	ECRGB025E11	Trimmer	

MOTHER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB7	YFVKZ555NP1A	Printed Circuit Board Assy	
IC1	TC4011BF	IC	
IC2	HD14053BFP	IC	
IC3	NJM2903M	IC	
IC4,5	TC4053BF	IC	
IC6,7	NJM4558M	IC	
IC8	M5232L	IC	
IC9	NJM723M	IC	
IC10	TC4011BF	IC	
Q1-3	2SD601-QRS	Transistor	
Q4	2SD602-QRS	Transistor	
Q5	2SC2405STU	Transistor	
Q6	2SD601-QRS	Transistor	
Q7,8	2SB709-QRS	Transistor	
Q9,10	2SD602-QRS	Transistor	
Q11	2SC2405STU	Transistor	
Q12	2SB709-QRS	Transistor	
Q13	2SD602-QRS	Transistor	
Q14	2SC2405STU	Transistor	
Q15	2SD602-QRS	Transistor	
Q16	2SC2405STU	Transistor	
Q17	2SB793A-RST	Transistor	
Q18	2SD973A-RS	Transistor	
Q19-21	2SD601-QRS	Transistor	
Q22,23	2SB709-QRS	Transistor	
Q24-27	2SD601-QRS	Transistor	
Q28	2SB709-QRS	Transistor	
Q29	2SD973A-RS	Transistor	
Q30	2SB793A-RST	Transistor	
Q31,32	2SD601-QRS	Transistor	
D1,2	MA151A	Diode	
D3	MA165	Diode	
D4,5	MA151A	Diode	
D6-9	MA165	Diode	
D10,11	MA151A	Diode	
D12-16	MA165	Diode	
D17,18	MA151A	Diode	
D19	MA165	Diode	
R1	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R2	ERJ8GCSJ564	Carbon	560K ohms 1/8W
R3	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R4	ERJ8GCSJ564	Carbon	560K ohms 1/8W
R5	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R6	ERJ8GCSJ564	Carbon	560K ohms 1/8W
R7	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R8,9	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R10	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R11	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R12	ERJ8GCSG821	Carbon	820 ohms 1/8W
R13	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R14	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R15	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R16	ERJ8GCSJ750	Carbon	75 ohms 1/8W
R17	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R18,19	ERJ8GCSJ750	Carbon	75 ohms 1/8W
R20	ERJ8GCSJ100	Carbon	10 ohms 1/8W
R21,22	ERJ8GCSJ564	Carbon	560K ohms 1/8W
R23	ERJ8GCSJ223	Carbon	22K ohms 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION	
R24,25	ERJ8GCSJ564	Carbon	560K ohms 1/8W
R26	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R27	ERJ8GCSG101	Carbon	100 ohms 1/8W
R28	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R29	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R30	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R31	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R32	ERJ8GCSG303	Carbon	30K ohms 1/8W
R33	ERJ8GCSG153	Carbon	15K ohms 1/8W
R34	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R35	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R36,37	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R38	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R39,40	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R41,42	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R43	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R44	ERJ8GCSG153	Carbon	15K ohms 1/8W
R45	ERJ8GCSG151	Carbon	150 ohms 1/8W
R46	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R47	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R48	ERJ8GCSG153	Carbon	15K ohms 1/8W
R49	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R50	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R51	ERJ8GCSG151	Carbon	150 ohms 1/8W
R52	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R53	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R54	ERJ8GCSG153	Carbon	15K ohms 1/8W
R55	ERJ8GCSG151	Carbon	150 ohms 1/8W
R56,57	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R58,59	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R60	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R61	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R62	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R67	ERJ8GCSG273	Carbon	27K ohms 1/8W
R68	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R69	ERJ8GCSG273	Carbon	27K ohms 1/8W
R70	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R71	ERJ8GCSG681	Carbon	680 ohms 1/8W
R72	ERJ8GCSG102	Carbon	1K ohms 1/8W
R73	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R74	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R75	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R76	ERJ8GCSG272	Carbon	2.7K ohms 1/8W
R77	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R78	ERJ8GCSG101	Carbon	100 ohms 1/8W
R79	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R80	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R81	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R82,83	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R84	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R85	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R86	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R87	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R88	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R89-91	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R92	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R93	ERD10TJ223	Carbon	22K ohms 1/8W
R94-96	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R97,98	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R99	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R100	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R101	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R102	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R103,104	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R105,106	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R107,108	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R109,110	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R111	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R112	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R113	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R114	ERJ8GCSG123	Carbon	12K ohms 1/8W
R115	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R116	ERD10TJ220	Carbon	22 ohms 1/8W
R117,118	ERJ8GCSJ220	Carbon	22 ohms 1/8W
R119	ERJ8GCSG432	Carbon	4.3K ohms 1/8W
R120	ERJ8GCSG562	Carbon	5.6K ohms 1/8W
R121	ERDS1TJ221	Carbon	220 ohms 1/2W
R122,123	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R124	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R125,126	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R127	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R128	ERJ8GCSJ124	Carbon	120K ohms 1/8W
R129	ERJ8GCSG123	Carbon	12K ohms 1/8W
R130	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R131	ERJ8GCSJ912	Carbon	9.1K ohms 1/8W
R132	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R133	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R134	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R135	ERD10TJ682	Carbon	6.8K ohms 1/8W
R136	ERD10TJ102	Carbon	1K ohms 1/8W
R137	ERD10TJ821	Carbon	820 ohms 1/8W
R138	ERD10TJ222	Carbon	2.2K ohms 1/8W
R139	ERD10TJ223	Carbon	22K ohms 1/8W
R140	ERD10TJ123	Carbon	12K ohms 1/8W
R141,142	ERD10TJ104	Carbon	100K ohms 1/8W
R143	ERDS2TJ5R6	Carbon	5.6K ohms 1/8W
VR1-3	YFP0T3321P13	Variable Resistor	1K ohms
VR4	YFP0T3321P52	Variable Resistor	500 ohms
C1	YF426473XKS	Ceramic	0.047 μF 50V
C2	YF426224FZS	Ceramic	0.22 μF 50V
C3	YF426473XKS	Ceramic	0.047 μF 50V
C4	YF426224FZS	Ceramic	0.22 μF 50V
C5	YF426473XKS	Ceramic	0.047 μF 50V
C6	YF426224FZS	Ceramic	0.22 μF 50V
C7	ECEA1ASS470	Electrolytic	47 μF 10V
C8	YF426100CHDS	Ceramic	10 pF 50V
C9	ECEA1CSS100	Electrolytic	10 uF 16V
C10	YF426102CHJS	Ceramic	1000 pF 50V
C11-13	ECEA1ASS470	Electrolytic	47 μF 10V
C14	ECEA1HK010	Electrolytic	1 μF 50V
C15,16	ECEA0JN330S	Electrolytic	33 uF 6.3V
C17	YF426102CHJS	Ceramic	1000 pF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C18	ECEA0JN330S	Electrolytic	33 µF 6.3V
C19	ECSF1AE476	Electrolytic	47 µF 10V
C20	ECSF1CE476	Electrolytic	47 µF 16V
C21	ECEA1ASS470	Electrolytic	47 µF 10V
C22	YF426222XMS	Ceramic	2200 pF 50V
C23	ECEA1ESS330	Electrolytic	33 µF 25V
C24	ECEA1CN100S	Electrolytic	10 µF 16V
C25	ECEA1EN4R7S	Electrolytic	4.7 µF 25V
C26	YF426102CHJS	Ceramic	1000 pF 50V
C27	ECEA1CN100S	Electrolytic	10 µF 16V
C28	YF426102CHJS	Ceramic	1000 pF 50V
C29	ECEA1CN100S	Electrolytic	10 µF 16V
C30	ECEA1HK010	Electrolytic	1 µF 50V
C31	ECSF0JE476	Plastic	47 µF 6.3V
C32	ECEA1CSS100	Electrolytic	10 µF 16V
C33,34	ECEA1CN100S	Electrolytic	10 µF 16V
C35	ECEA1HK010	Electrolytic	1 µF 50V
C36	ECEA1CN100S	Electrolytic	10 µF 16V
C37	ECEA1HK010	Electrolytic	1 µF 50V
C38	ECEA1CN100S	Electrolytic	10 µF 16V
C39	ECSF1CE226	Electrolytic	22 µF 16V
SW1	YFSSS212YK	Slide Switch	
CN1-6-JM	YFD531STDS	Multi-pin Connector	
CN8	EMCS0652M	6 pin Jack Male	
CN9	EMCS0652M1G	6 pin Jack Male	
CN10	EMCS0652M1R	6 pin Jack Male	
CN11	EMCS0452M	4 pin Jack Male	
CN13	EMCS0552M	5 pin Jack Male	
CN14	EMCS0352M	3 pin Jack Male	
CN15	EMCS0852M	8 pin Jack Male	
CN16	EMCS0752M	7 pin Jack Male	
CN17	EMCS1052M	10 pin Jack Male	
CN18	EMCS0452M	4 pin Jack Male	
CN19	EMCS1252M	12 pin Jack Male	
CN20	EMCS0352M	3 pin Jack Male	
CN21	EMCS0552M	5 pin Jack Male	
CN22	EMCS0652M	6 pin Jack Male	

PROCCESS-1 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB8	YFVKZ555NP2A	Printed Circuit Board Assy	
IC1-3	AN610P	IC	
IC4	TC4053BF	IC	
IC5	NJM4558M	IC	
Q1	2SC2405STU	Transistor	
Q2,3	2SC2404-CD	Transistor	
Q4	2SC2405STU	Transistor	
Q5	2SC2404-CD	Transistor	
Q6	2SC2405STU	Transistor	
Q7	2SB709-QRS	Transistor	
Q9	2SA1034-ST	Transistor	
Q10	2SA1022-CD	Transistor	
Q11	2SB709-QRS	Transistor	
Q12	2SD601-QRS	Transistor	
Q13	2SA1034-ST	Transistor	
Q14	2SB709-QRS	Transistor	
Q15	2SC2405STU	Transistor	
Q16,17	2SC2404-CD	Transistor	
Q18	2SC2405STU	Transistor	
Q19	2SC2404-CD	Transistor	
Q20	2SC2405STU	Transistor	
Q21	2SB709-QRS	Transistor	
Q23	2SA1034-ST	Transistor	
Q24	2SA1022-CD	Transistor	
Q25	2SB709-QRS	Transistor	
Q26	2SD601-QRS	Transistor	
Q27	2SA1034-ST	Transistor	
Q28	2SB709-QRS	Transistor	
Q29-31	2SD601-QRS	Transistor	
Q32	2SC2405STU	Transistor	
Q33,34	2SC2404-CD	Transistor	
Q35	2SC2405STU	Transistor	
Q36	2SC2404-CD	Transistor	
Q37	2SC2405STU	Transistor	
Q38	2SB709-QRS	Transistor	
Q40	2SA1034-ST	Transistor	
Q41	2SA1022-CD	Transistor	
Q42	2SB709-QRS	Transistor	
Q43	2SD601-QRS	Transistor	
Q44	2SA1034-ST	Transistor	
Q45,46	2SB709-QRS	Transistor	
Q47	2SD601-QRS	Transistor	
Q48-50	2SB709-QRS	Transistor	
Q51	2SD601-QRS	Transistor	
Q52	2SB709-QRS	Transistor	
Q53,54	2SK198-Q	Transistor	
Q55	2SB709-QRS	Transistor	
Q56,57	2SD601-QRS	Transistor	
Q58	2SB709-QRS	Transistor	
R1	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R2	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R3	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R4	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R5	ERJ8GCSG622	Carbon	6.2K ohms 1/8W
R6	ERJ8GCSG101	Carbon	100 ohms 1/8W
R7	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R9	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R10	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R11	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R12	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R13	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R14,15	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R16	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R17	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R18	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R19	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R20	ERJ8GCSG152	Carbon	1.5K ohms 1/8W
R21	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R22	ERJ8GCSG271	Carbon	270 ohms 1/8W
R23	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R24	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R25	ERJ8GCSG392	Carbon	3.9K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R26	ERJ8GCSG183	Carbon	18K ohms 1/8W
R27	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R28	ERJ8GCSJ101	Carbon	100 ohms 1/8W
R29	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R30	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R31	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R32	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R33	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R34	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R35	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R36	ERJ8GCSG242	Carbon	2.4K ohms 1/8W
R37	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R38	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R39	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R40	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R41	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R42	ERJ8GCSG101	Carbon	100 ohms 1/8W
R43	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R45	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R46	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R47	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R48	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R49	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R50,51	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R52	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R53	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R54	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R55	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R56	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R57	ERJ8GCSG152	Carbon	1.5K ohms 1/8W
R58	ERJ8GCSG271	Carbon	270 ohms 1/8W
R59	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R60	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R61	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R62	ERJ8GCSG183	Carbon	18K ohms 1/8W
R63	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R64	ERJ8GCSG101	Carbon	100 ohms 1/8W
R65	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R66	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R67	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R68	ERJ8GCSG332	Carbon	3.3K ohms 18W
R69	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R70	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R71	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R72	ERJ8GCSG242	Carbon	2.4K ohms 1/8W
R73	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R74,75	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R77	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R78	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R79	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R80	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R81	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R82	ERJ8GCSG101	Carbon	100 ohms 1/8W
R83	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R84	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R85	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R86	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R87	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R88	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R89,90	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R91	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R92	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R93	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R94	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R95	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R96	ERJ8GCSG152	Carbon	1.5K ohms 1/8W
R97	ERJ8GCSG271	Carbon	270 ohms 1/8W
R98	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R99	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R100	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R101	ERJ8GCSG183	Carbon	18K ohms 1/8W
R102	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R103	ERJ8GCSG101	Carbon	100 ohms 1/8W
R104	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R105	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R106	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R107	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R108	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R109	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R110	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R111	ERJ8GCSG242	Carbon	2.4K ohms 1/8W
R112	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R113	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R114	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R115	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R116	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R117	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R118	ERJ8GCSG681	Carbon	680 ohms 1/8W
R119	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R120	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R121	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R122	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R123	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R124	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R125	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R126	ERJ8GCSJ101	Carbon	100 ohms 1/8W
R127	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R128	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R129	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R130	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R131	ERJ8GCSG681	Carbon	680 ohms 1/8W
R132	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R133	ERJ8GCSG202	Carbon	2K ohms 1/8W
R134	ERJ8GCSG821	Carbon	820 ohms 1/8W
R135	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R136	ERJ8GCSG821	Carbon	820 ohms 1/8W
R137	ERJ8GCSG302	Carbon	3K ohms 1/8W
R138	ERJ8GCSG242	Carbon	2.4K ohms 1/8W
R139	ERJ8GCSG272	Carbon	2.7K ohms 1/8W
R140	ERJ8GCSG682	Carbon	6.8K ohms 1/8W
R141	ERJ8GCSG222	Carbon	2.2K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R142	ERJ8GCSG272	Carbon	2.7K ohms 1/8W
R143	ERJ8GCSG682	Carbon	6.8K ohms 1/8W
R144	ERJ8GCSG222	Carbon	2.2K ohms 1/8W
R145	ERJ8GCSG302	Carbon	3K ohms 1/8W
R146	ERJ8GCSG242	Carbon	2.4K ohms 1/8W
R149	ERJ8GCSJ220	Carbon	22 ohms 1/8W
R150	ERJ8GCSJ470	Carbon	47 ohms 1/8W
R151	ERJ8GCSG181	Carbon	180 ohms 1/8W
R152	ERJ8GCSJ470	Carbon	47 ohms 1/8W
R153-155	ERJ8GCSG183	Carbon	18K ohms 1/8W
R156	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R157	ERJ8GCSG392	Carbon	3.9K ohms 1/8W
R158-160	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R161-164	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R165-167	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R168	ERJ8GCSG123	Carbon	12K ohms 1/8W
R169	ERJ8GCSG333	Carbon	33K ohms 1/8W
R170	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R171	ERJ8GCSJ163	Carbon	16K ohms 1/8W
R172	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R174-176	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R177-180	ERD10TJ102	Carbon	1K ohms 1/8W
R181	ERD10TJ392	Carbon	3.9K ohms 1/8W
VR1	YFH0622A330	Variable Resistor	330 ohms
VR2-5	YFH0622A4R7K	Variable Resistor	4.7K ohms
VR6	YFH0622A1R5K	Variable Resistor	1.5K ohms
VR7-10	YFH0622A4R7K	Variable Resistor	4.7K ohms
VR11	YFH0622A1K	Variable Resistor	1K ohms
VR12-15	YFH0622A4R7K	Variable Resistor	4.7K ohms
VR16-18	YFH0622A47K	Variable Resistor	47K ohms
C1	ECEA1ASS101	Electrolytic	100 μF 10V
C2,3	ECEA1ASS470	Electrolytic	47 μF 10V
C4	YF426473XKS	Ceramic	0.047 μF 50V
C5	ECQV1H224JZ	Plastic	0.22 μF 50V
C6	ECEA1CN100S	Electrolytic	10 μF 16V
C7	ECEA1CSS100	Electrolytic	10 μF 16V
C8	ECEA0JU101	Electrolytic	100 μF 6.3V
C9-12	ECEA1ASS470	Electrolytic	47 μF 10V
C13	ECEA1ASS101	Electrolytic	100 μF 10V
C14	ECEA1ASS470	Electrolytic	47 μF 10V
C15	YF426473XKS	Ceramic	0.047 μF 50V
C16	ECQV1H224JZ	Plastic	0.22 μF 50V
C17	ECEA1CN100S	Electrolytic	10 μF 16V
C18	ECEA1CSS100	Electrolytic	10 μF 16V
C19	ECEA0JU101	Electrolytic	100 μF 6.3V
C20-22	ECEA1ASS470	Electrolytic	47 μF 10V
C23	YF426331CHJS	Ceramic	330 pF 50V
C24	ECEA1ASS470	Electrolytic	47 μF 10V
C25	ECEA1ASS101	Electrolytic	100 μF 10V
C26	ECEA1ASS470	Electrolytic	47 μF 10V
C27	YF426473XKS	Ceramic	0.047 μF 50V
C28	ECQV1H224JZ	Plastic	0.22 μF 50V
C29	ECEA1CN100S	Electrolytic	10 μF 16V
C30	ECEA1CSS100	Electrolytic	10 μF 16V
C31	ECEA0JU101	Electrolytic	100 μF 6.3V
C32-34	ECEA1ASS470	Electrolytic	47 μF 10V

SYM-BOL NO.	PART NO.	DESCRIPTION	
C35	ECEA1ASS101	Electrolytic	100 μF 10V
C36	ECEA1ASS470	Electrolytic	47 μF 10V
C37	ECSF1AE335	Electrolytic	3.3 μF 10V
C38	ECSF1AE225	Electrolytic	2.2 μF 10V
C39	ECEA1ASS470	Electrolytic	47 μF 10V
C40,41	ECSF1AE225	Electrolytic	2.2 μF 10V
C42,43	ECEA1ASS470	Electrolytic	47 μF 10V
C44,45	YF426103XMS	Ceramic	10000 pF 50V
C46	ECEA1CSS100	Electrolytic	10 μF 16V
C47,48	YF426103XMS	Ceramic	10000 pF 50V
C49	ECEA1CSS100	Electrolytic	10 μF 16V
C50,51	ECEA1ASS470	Electrolytic	47 μF 10V
C52-54	YF426224FZS	Ceramic	0.22 μF 50V
SW1	YWSSS322	Slide Switch	
CN1	YFD531PTDS	Multi-pin Connector	

HIGH VOLTAGE BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB12	YFVKZ555NP6A	Printed Circuit Board Assy	
IC1	DN819	IC	
IC2	NJM4558M	IC	
IC3	HD14053BFP	IC	
IC4,5	NJM4558M	IC	
IC6	TC4538BF	IC	
Q1	2SB709-QRS	Transistor	
Q2	2SD601-QRS	Transistor	
Q3	2SC1384-RS	Transistor	
Q4,5	2SA684-RS	Transistor	
Q6	2SD601-QRS	Transistor	
Q7,8	2SD814-QRS	Transistor	
Q9	2SD601-QRS	Transistor	
Q10,11	2SD814-QRS	Transistor	
Q12	2SD601-QRS	Transistor	
Q13,14	2SD814-QRS	Transistor	
Q15	2SD602-QRS	Transistor	
Q16-20	2SB788-RS	Transistor	
Q21,22	2SD601-QRS	Transistor	
Q23	2SD602-QRS	Transistor	
Q24	2SB709-QRS	Transistor	
D1,2	MA151A	Diode	
D3-12	ES1F	Diode	
D13-15	MA162	Diode	
D16	MA151A	Diode	
D17	MA4051L	Diode	
D18,19	MA151A	Diode	
D20	05Z2.7	Diode	
D21-23	MA151A	Diode	
R1	ERJ8GCSG153	Carbon	15K ohms 1/8W
R2	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R3	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R4-7	ERJ8GCSG271	Carbon	270 ohms 1/8W
R8	ERD10TJ332	Carbon	3.3K ohms 1/8W
R9	ERD10TJ102	Carbon	1K ohms 1/8W
R10	ERD10TJ561	Carbon	560 ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R11	ERD10TJ104	Carbon	100K ohms 1/8W	R85	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R12-14	ERD25TJ225	Carbon	2200K ohms 1/4W	R86	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R15	YFGS12945FB	Metal	9.4M ohms 1/2W	R87	ERJ8GCSG101	Carbon	100 ohms 1/8W
R16	YFGS14625FB	Metal	6.2M ohms 1/4W	R88	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R17	YFGS14205FB	Metal	2M ohms 1/4W	R89	ERJ8GCSG153	Carbon	15K ohms 1/8W
R18	YFGS14275FB	Metal	2.7M ohms 1/4W	R90	ERJ8GCSG273	Carbon	27K ohms 1/8W
R22-24	ERD10TJ104	Carbon	100K ohms 1/8W	R91	ERJ8GCSG101	Carbon	100 ohms 1/8W
R26	ERJ8GCSJ104	Carbon	100K ohms 1/8W	R100-102	ERD10TJ105	Carbon	1M ohms 1/8W
R27	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W	VR1-3	YFP0T3321P16	Variable Resistor	1M ohms
R28	ERJ8GCSJ473	Carbon	47K ohms 1/8W	VR4-6	YW3321P1205	Variable Resistor	2M ohms
R29	ERJ8GCSJ223	Carbon	22K ohms 1/8W	VR7-9	YFH0621A33K	Variable Resistor	33K ohms
R31	ERJ8GCSG332	Carbon	3.3K ohms 1/8W	VR11	EVM8AGA00BQ2	Variable Resistor	470 ohms
R33	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W	VR12	EVM8AGA00B14	Variable Resistor	10K ohms
R34	ERJ8GCSJ104	Carbon	100K ohms 1/8W	C1	ECEA1HS010S	Electrolytic	1 μF 50V
R35	ERJ8GCSJ473	Carbon	47K ohms 1/8W	C2	ECEA1CS101	Electrolytic	100 μF 16V
R36	ERJ8GCSJ223	Carbon	22K ohms 1/8W	C3,4	ECEA1AS470	Electrolytic	47 μF 10V
R38	ERJ8GCSG332	Carbon	3.3K ohms 1/8W	C5	ECKD3D821KB	Ceramic	810 pF 5KV
R40	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W	C6	ECEA2ES010	Electrolytic	1 μF 250V
R41	ERJ8GCSJ104	Carbon	100K ohms 1/8W	C7	ECEA2AS100	Electrolytic	10 μF 100V
R42	ERJ8GCSJ473	Carbon	47K hms 1/8W	C8	ECEA1HS470	Electrolytic	47 μF 50V
R43	ERJ8GCSJ223	Carbon	22K ohms 1/8W	C9	ECEA2WS010	Electrolytic	1 μF 450V
R46	ERJ8GCSG332	Carbon	3.3K ohms 1/8W	C10	ECEA2AS100	Electrolytic	10 μF 100V
R47	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C11	ECKD3D821KB	Ceramic	820 pF 5KV
R48	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C12	ECEA2AS010	Electrolytic	1 μF 100V
R49	ERJ8GCSG332	Carbon	3.3K ohms 1/8W	C13	ECKD3D821KB	Ceramic	820 pF 5KV
R50,51	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C14	ECEA2AS010	Electrolytic	1 μF 100V
R52	ERD10TJ101	Carbon	100 ohms 1/8W	C15	ECKD3D821KB	Ceramic	820 pF 5KV
R53	ERDS2TJ5R6	Carbon	5.6 ohms 1/8W	C16	ECEA2AS010	Electrolytic	1 μF 100V
R54	ERD10TJ273	Carbon	27K ohms 1/8W	C17	ECQE16682N66	Plastic	0.0068 uF 1600V
R55	ERD10TJ222	Carbon	2.2K ohms 1/8W	C18	ECEA2AS010	Electrolytic	1 μF 100V
R56	ERD10TJ103	Carbon	10K ohms 1/8W	C19	ECQE6103JZ	Plastic	0.01 μF 600V
R57	ERD10TJ393	Carbon	39K ohms 1/8W	C20-22	ECQE2104KS	Plastic	0.1 μF 200V
R58,59	ERD10TJ103	Carbon	10K ohms 1/8W	C23-25	ECQM2332KZ	Plastic	3300 pF 200V
R60	ERJ8GCSJ473	Carbon	47K ohms 1/8W	C26	ECEA1AS101	Electrolytic	100 μF 10V
R61	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W	C27-29	YF426560SLKS	Ceramic	56 pF 50V
R62	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	C30	ECEA1AS101	Electrolytic	100 μF 10V
R63	ERJ8GCSJ331	Carbon	330 ohms 1/8W	C32	ECEA2AS010	Electrolytic	1 μF 100V
R64	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	C33	ECQP1181JZ	Plastic	180 pF 100V
R65	ERJ8GCSJ564	Carbon	560K ohms 1/8W	C34,35	ECEA2AS4R7	Electrolytic	4.7 μF 200V
R67	ERJ8GCSJ224	Carbon	220K ohms 1/8W	C36-38	ECQP1221JZ	Plastic	220 pF 100V
R68	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	C39	ECEA0JN330S	Electrolytic	33 μF 6.3V
R69	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	C40	ECEA1AS470	Electrolytic	47 μF 10V
R70	ERJ8GCSJ684	Carbon	680K ohms 1/8W	C41	YF426103XMS	Ceramic	0.01 μF 50V
R71	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C42-44	ECEA1HN010S	Electrolytic	1 μF 50V
R72,73	ERJ8GCSG512	Carbon	5.1K ohms 1/8W	C45	ECEA1EN4R7S	Electrolytic	4.7 μF 25V
R74	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	C46	ECEA1HN010S	Electrolytic	1 μF 50V
R75	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C48	ECEA1CSS221	Electrolytic	220 μF 16V
R76	ERJ8GCSG512	Carbon	5.1K ohms 1/8W	C49	ECEA1CS470	Electrolytic	47 μF 16V
				C50	YF426470SLKS	Ceramic	47 pF 50V
R77	ERJ8GCSJ274	Carbon	270K ohms 1/8W	C51	YF426223XKS	Ceramic	0.022 μF 50V
R78	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C52	ECKF1H152KB	Ceramic	1500 pF 50V
R79	ERJ8GCSG303	Carbon	30K ohms 1/8W	L1	ELQ391D028J	Coil	390 μH
R80	ERJ8GCSG153	Carbon	15K ohms 1/8W	T1	ECXC0A76	Flyback Transformer	
R81	ERJ8GCSJ104	Carbon	100K ohms 1/8W	J25,30	ERJ8GCS0R00	Jumper Resistor	
R82	ERJ8GCSJ473	Carbon	47K ohms 1/8W	J32,37	ERJ8GCS0R00	Jumper Resistor	
R83,84	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	J39,45	ERJ8GCS0R00	Jumper Resistor	

SYMBOL NO.	PART NO.	DESCRIPTION
CN32-JM	EMCS0552M	5 pin Jack Male
CN33-JM	EMCS0752M	7 pin Jack Male
CN46-JM	EMCS0252M	2 pin Jack Male
M55	YFV2HA0113A3	Shield Parts

DEFLECTION BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB13	YFVKZ555NP7A	Printed Circuit Board Assy	
IC4-6	NJM4556D	IC	
IC8	NJM4556D	IC	
IC9,10	NJM3415D	IC	
Q1-3	2SD636-RS	Transistor	
Q4	2SB641-RS	Transistor	
Q5	2SD638-QR	Transistor	
Q6	2SD959-PQ	Transistor	
Q7	2SC1567-QR	Transistor	
Q8	2SA564-RS	Transistor	
Q9	2SD638-QR	Transistor	
Q10	2SB643-RS	Transistor	
Q11	2SD638-QR	Transistor	
Q12	2SB643-RS	Transistor	
Q13	2SD638-QR	Transistor	
Q14	2SB643-RS	Transistor	
Q15	2SB641-RS	Transistor	
Q16	2SD636-RS	Transistor	
Q17,18	2SB641-RS	Transistor	
Q19,20	2SD636-RS	Transistor	
Q21	2SB788-RS	Transistor	
D1-10	MA165	Diode	
R1	ERD10TJ154	Carbon	150K ohms 1/8W
R2	ERD10TJ824	Carbon	820K ohms 1/8W
R3	ERD10TJ393	Carbon	39K ohms 1/8W
R4	ERD10TJ823	Carbon	82K ohms 1/8W
R5	ERD10TJ104	Carbon	100K ohms 1/8W
R13	ERD10TJ222	Carbon	2.2K ohms 1/8W
R14,15	ERD10TJ153	Carbon	15K ohms 1/8W
R16	ERD10TJ563	Carbon	56K ohms 1/8W
R17	ERD10TJ272	Carbon	2.7K ohms 1/8W
R18	ERD10TJ103	Carbon	10K ohms 1/8W
R19	ERD10TJ563	Carbon	56K ohms 1/8W
R34,35	ERD10TJ103	Carbon	10K ohms 1/8W
R36	ERD10TJ332	Carbon	3.3K ohms 1/8W
R37	ERD10TJ104	Carbon	100K ohms 1/8W
R38	ERD10TJ102	Carbon	1K ohms 1/8W
R39	ERD10TJ562	Carbon	5.6K ohms 1/8W
R40	ERD10TJ331	Carbon	330 ohms 1/8W
R41	ERD10TJ561	Carbon	560 ohms 1/8W
R42	ERD10TJ562	Carbon	5.6K ohms 1/8W
R43,44	ERD10TJ472	Carbon	4.7K ohms 1/8W
R45-47	ERD10TJ102	Carbon	1K ohms 1/8W
R48	ER0S2CKF1000	Metal	100 ohms 1/8W
R49	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R50	ER0S2CKF91R0	Metal	91 ohms 1/8W
R51,52	ERD10TJ222	Carbon	2.2K ohms 1/8W
R53	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R54	ER0S2CKF2703	Metal	270K ohms 1/8W
R55	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R56	ER0S2CKF1000	Metal	100 ohms 1/8W
R57	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R58	ER0S2CKF91R0	Metal	91 ohms 1/8W
R59,60	ERD10TJ222	Carbon	2.2K ohms 1/8W
R61	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R62	ER0S2CKF2703	Metal	270K ohms 1/8W
R63	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R64	ER0S2CKF1000	Metal	100 ohms 1/8W
R65	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R66	ER0S2CKF91R0	Metal	91 ohms 1/8W
R67,68	ERD10TJ222	Carbon	2.2K ohms 1/8W
R69	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R70	ER0S2CKF2703	Metal	270K ohms 1/8W
R71	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R72,73	ERD10TJ103	Carbon	10K ohms 1/8W
R74	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R75	ER0S2CKF47R0	Metal	47 ohms 1/8W
R76	ER0S2CKF1001	Metal	1K ohms 1/8W
R77	ERD10TJ332	Carbon	3.3K ohms 1/8W
R78	ERD10TJ104	Carbon	100K ohms 1/8W
R79	ERD10TJ151	Carbon	150 ohms 1/8W
R80	ERD10TJ393	Carbon	39K ohms 1/8W
R81,82	ERD10TJ222	Carbon	2.2K ohms 1/8W
R83,84	ERD10TJ152	Carbon	1.5K ohms 1/8W
R85-87	ERD10TJ103	Carbon	10K ohms 1/8W
R88,89	ERD10TJ332	Carbon	3.3K ohms 1/8W
R92,93	ERD10TJ152	Carbon	1.5K ohms 1/8W
R94,95	ERD10TJ562	Carbon	5.6K ohms 1/8W
R96	ERD10TJ102	Carbon	1K ohms 1/8W
R97	ERD10TJ682	Carbon	6.8K ohms 1/8W
R98	ERD10TJ562	Carbon	5.6K ohms 1/8W
R99	ER0S2CKF2700	Metal	270 ohms 1/8W
R100	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R101	ER0S2CKF5601	Metal	5.6K ohms 1/8W
R102	ER0S2CKF1202	Metal	12K ohms 1/8W
R103	ER0S2CKF2202	Metal	22K ohms 1/8W
R105	ER0S2CKF33R0	Metal	33 ohms 1/8W
R106	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R107	ER0S2CKF2700	Metal	270 ohms 1/8W
R108	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R109	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R110	ER0S2CKF1202	Metal	12K ohms 1/8W
R111	ER0S2CKF33R0	Metal	33 ohms 1/8W
R112	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R113	ER0S2CKF2700	Metal	270 ohms 1/8W
R114	ER0S2CKF2701	Metal	2.7K ohms 1/8W
R115	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R116	ER0S2CKF1202	Metal	12K ohms 1/8W
R117	ER0S2CKF33R0	Metal	33 ohms 1/8W
R118	ER0S2CKF2201	Metal	2.2K ohms 1/8W
R119	ER0S2CKF1502	Metal	15K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R120	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R121	ER0S2CKF1001	Metal	1K ohms 1/8W
R122	ER0S2CKF47R0	Metal	47 ohms 1/8W
R123	ER0S2CKF4701	Metal	4.7K ohms 1/8W
R124	ER0S2CKF1001	Metal	1K ohms 1/8W
R125	ER0S2CKF47R0	Metal	47 ohms 1/8W
R126	ERD10TJ103	Carbon	10K ohms 1/8W
R127	ERD10TJ223	Carbon	22K ohms 1/8W
R128	ERD10TJ103	Carbon	10K ohms 1/8W
R129	ERD10TJ223	Carbon	22K ohms 1/8W
R133,134	ERD10TJ103	Carbon	10K ohms 1/8W
VR1-3	YFH0621A1M	Variable Resistor	1M ohms
VR7	YFP0T3321P53	Variable Resistor	5K ohms
VR8	YFP0T3321P52	Variable Resistor	500 ohms
VR9	YFP0T3321P14	Variable Resistor	10K ohms
VR10	YFP0T3321P52	Variable Resistor	500 ohms
VR11	YFP0T3321P14	Variable Resistor	10K ohms
VR12	YFP0T3321P52	Variable Resistor	500 ohms
VR13-18	YFP0T3321P14	Variable Resistor	10K ohms
VR19	YFP0T3321P53	Variable Resistor	5K ohms
VR20,21	YFP0T3321P23	Variable Resistor	2K ohms
VR22-27	YFP0T3321P14	Variable Resistor	10K ohms
C1	ECEA1ASS470	Electrolytic	47 μF 10V
C2	ECEA1CSS100	Electrolytic	10 μF 16V
C3	ECQV1H473JZ	Plastic	0.047 μF 50V
C4	ECQP1102JZ	Plastic	1000 pF 100V
C5	ECEA1ASS470	Electrolytic	47 μF 10V
C6	ECEA2AS2R2	Electrolytic	2.2 μF 100V
C10-12	ECQV05104JZ	Plastic	0.1 μF 50V
C21	ECSF1AE225	Electrolytic	2.2 μF 10V
C22	ECEA1ASS470	Electrolytic	47 μF 10V
C23	ECKF1H152KB	Ceramic	1500 pF 50V
C24	ECEA1ASS470	Electrolytic	47 μF 10V
C25	ECEA1HSS010	Electrolytic	1 μF 50V
C26	ECQP1472JZ	Plastic	4700 pF 100V
C27	ECEA1CSS100	Electrolytic	10 μF 16V
C28	ECQP1822JZ	Plastic	8200 pF 100V
C29-34	ECSF0JE476	Plastic	47 μF 6.3V
C35	ECQP1222JZ	Plastic	2200 pF 100V
C36	ECQP1681JZ	Plastic	680 pF 100V
C37	ECEA1ASS470	Electrolytic	47 μF 10V
C38	ECQP1222JZ	Plastic	2200 pF 100V
C39	ECQP1681JZ	Plastic	680 pF 100V
C40	ECQP1222JZ	Plastic	2200 pF 100V
C41	ECQP1681JZ	Plastic	680 pF 100V
C42	ECEA1ASS470	Electrolytic	47 μF 10V
C43	ECQP1103JZ	Plastic	0.01 μF 100V
C44	ECQV05104JZ	Plastic	0.1 μF 50V
C45	ECEA1ASS470	Electrolytic	47 μF 10V
C46	ECEA1HSS010	Electrolytic	1 μF 50V
C47	ECSF1CE225	Electrolytic	2.2 μF 16V
C48	ECSF16E3R3	Electrolytic	3.3 μF 16V
C49	ECEA1ASS470	Electrolytic	47 μF 10V
C50,51	ECEA1AN220S	Electrolytic	22 μF 10V
C52	ECSF1CE225	Electrolytic	2.2 μF 16V

SYM-BOL NO.	PART NO.	DESCRIPTION	
C53	ECEA1HSSR22	Electrolytic	0.22 μF 50V
C54	ECEA1ASS470	Electrolytic	47 μF 10V
C55-57	ECEA1AN220S	Electrolytic	22 μF 10V
C58,59	ECEA1ASS470	Electrolytic	47 μF 10V
C60	ECQM1H822KZ	Plastic	8200 pF 50V
C62	ECQV05104JZ	Plastic	0.1 μF 50V
C63	ECQM1H822KZ	Plastic	8200 pF 50V
C64	ECQV05104JZ	Plastic	0.1 μF 50V
C65	ECQP1102JZ	Plastic	1000 pF 100V
C66	ECQM1H822KZ	Plastic	8200 pF 50V
C67	ECQV05104JZ	Plastic	0.1 μF 50V
C68	ECQP1103JZ	Plastic	0.01 μF 100V
C69	ECQV05104JZ	Plastic	0.1 μF 50V
C70	ECQP1103JZ	Plastic	0.01 μF 100V
C71	ECQV05104JZ	Plastic	0.1 μF 50V
C72	ECKF1H152KB	Ceramic	1500 pF 50V
C73	ECEA1ASS470	Electrolytic	47 μF 10V
C74	ECKF1H152KB	Ceramic	1500 pF 50V
C75	ECEA1ASS470	Electrolytic	47 μF 10V
C76-81	ECSF0JE476	Plastic	47 μF 6.3V
L1	YFLH103JZ	Coil	10 mH
L3-5	YF3SL1	Coil	65 μH
L6-11	ELQ333D008J	Coil	33mH
SW1	YWSSS322	Slide Switch	
CN1-3-JM	EMCS0952M	9 pin Jack Male	
CN4-JM	EMCS0652M	6 pin Jack Male	
CN5-JM	EMCS0752M	7 pin Jack Male	
CN6,7-JM	EMCS0252M	2 pin Jack Male	
CN8-JM	EMCS0252M1G	2 pin Jack Male	
CN9-JM	EMCS0252M1R	2 pin Jack Male	
M17	YFV2SA0081B4	Mounting Angle for Board	

POWER BOARD.

PCB15	YFVKZ0555P8S	Printed Circuit Board Assy	
D1	YUDRM-1Z	Diode	
D2	YUDRM-1Z	Diode	
C1	ECEA1ESS331	Electrolytic	330 μF 25V
C2	ECEA1ESS330	Electrolytic	33 μF 25V
SW1	YFM2013ESP	Toggle Switch	
F1	XBA1C30NU100	Current Fuse	3A
E1	YWSN5053	Fuse Holder	
CN37-JM	EMCS0352M	3 pin Jack Male	

CENTERING CONTROL BOARD

PCB18	YFVKZ555NP9A	Printed Circuit Board Assy	
R1,2	ERD10TJ473	Carbon	47K ohms 1/8W
R3,4	ERD10TJ223	Carbon	22K ohms 1/8W
J5	ERD10T0	Jumper Resistor	
VR1-4	YFP0T3321P14	Variable Resistor	10K ohms
CN39-JM	EMCS0352M	3 pin Jack Male	

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
CN40-JM	EMCS0252M	2 pin Jack Male			
CN41-JM	EMCS0752M	7 pin Jack Male			
M63	YFV3AA0002A4	Blind Label for Switch			

ACCESSORY PARTS/PACKAGING PARTS.

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB101	YFVKZ0555PHA	Extension Board
BAT101	UM-3DEP	Battery
M81	WN-0003	Bayonet Mounting Cap
M101	o YFV8QA0718AN	Operating Instructions
M102	19998700331	Warranty Card for WV-N3/B
M103	YWV22XPRB99K	Service Center List
M104	YFV8RA0011A3	Registration Chart
M105	YWV2300RB02	Color Chart
M107	XZB26X40C05	Polyethylene Bag for Printed Matter
M108	YWT10X16C03	Polyethelene Bag for Extension board
M109	XZB55X71C1	Polyethylene Bag for Camera
M110	YWT100X120X1	Polyethylene Bag for Carrying Case
M111	YFV8NA0012AN	Rain Coat
M112	WV-CC32PU	Carrying Case
M113	YFV8RA0032BN	Auto Set Chart
M114	YFV9CA0336AN	Packaging
M115	YFV9CA0110AN	Packaging